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MILITARY HANDBOOK

DRYDOCKING FACILITIES

CHARACTERISTICS



AMSC N/A

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ABSTRACT

Navy drydocking facilities include graving drydocks, marine railways and marine lifts. Presented are the principal dimensions and characteristics of these drydocking facilities and plans indicating their locations in naval shipyards or other naval shore installations.

FOREWORD

This military handbook has been developed from an evaluation of facilities in the shore establishment, from surveys of the availability of new materials and construction methods, and from selection of the best design practices of the Naval Facilities Engineering Command (NAVFACENGCOM), other Government agencies, and the private sector. This handbook was prepared using, to the maximum extent feasible, national professional society, association, and institute standards. Deviations from this criteria, in the planning, engineering, design, and constructions of Naval shore facilities, cannot be made without prior approval of NAVFACENGCOM HQ Code 04.

Design cannot remain static any more than the functions it serves or the technologies it uses. Accordingly, recommendations for improvement are encouraged and should be furnished to Commander, Naval Facilities Engineering Command (Code 04), 200 Stovall Street, Alexandria, VA 22332-2300; telephone (202) 325-0450.

THIS HANDBOOK SHALL NOT BE USED AS A REFERENCE DOCUMENT FOR PROCUREMENT OF FACILITIES CONSTRUCTION. IT IS TO BE USED IN THE PURCHASE OF FACILITIES ENGINEERING STUDIES AND DESIGN (FINAL PLANS, SPECIFICATIONS, AND COST ESTIMATES). DO NOT REFERENCE IT IN MILITARY OR FEDERAL SPECIFICATIONS OR OTHER PROCUREMENT DOCUMENTS.

DRYDOCKS AND MARINE RAILWAYS CRITERIA MANUALS

CRITERIA MANUAL	TITLE	P A
DM-29.1	Graving Drydocks	HDQTRS
DM-29.2	Marine Railways	HDQTRS
MIL-HDBK-1029/3	Drydocking Facilities Characteristics	HDQTRS

DRYDOCKING FACILITIES CHARACTERISTICS

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Section 1: INTRODUCTION

1.1. Scope. This handbook presents drydocking facilities characteristics in tabular and figure form for graving drydocks, marine railways and lifts. Plans are also presented indicating the locations of drydocking facilities in naval shipyards or other naval shore installations,

1.2. Cancellation. This handbook, Drydocking Facilities Characteristics, MIL-HDBK-1029/3, cancels and supersedes NAVFAC DM-29.3, Drydocking Facilities Characteristics, of November 1981.

Section 2: FACILITIES CHARACTERISTICS SUMMARY

2.1. Tabular Data. Table 1 presents graving drydock, marine railway and lift general locations, facility number designation, size, depth of water, tide range, and types of vessels suitable for docking.

These data indicate the range of drydocking facilities existing in the Naval Shore Establishment for planning of drydocking operations. Several of the tabulated facilities are currently leased or on inactive status, but in most instances, they may be reactivated upon short notice.

Section 3: FACILITIES LOCATIONS AND GENERAL DATA

3.1. Figure Data. Figures 1 through 70 present graving drydock, marine railway and lift specific locations in the Naval Shore Establishment. Each facility is defined by a location plan, longitudinal section, and typical cross-section with limited design, construction and foundation information, and key dimensions. General data are given for each drydocking facility.

3.1.1. Graving Drydocks. Data includes the date of construction, type of entrance closure, dewatering and flooding system, power capstans, portal cranes, and ship and industrial services furnished at the dock.

3.1.2. Marine Railways. Data includes the date of construction, rated capacity, groundways and cradle description, hauling mechanism, portal cranes, and ship and industrial services furnished at the railway.

3.1.3. Marine Lifts. Data includes the date of construction, rated capacity, lift type, capacity of hoists, description of cradle, lift platform and transfer systems, and the ship, industrial and crane services available at the lift.

3.2, Data Limitations. Ship and industrial services described are built-in permanent types. Portable components are often available to supplement quantities to suit peak demands or special requirements. For detailed information on structures, outfitting equipment, and service systems, refer to Naval Facilities Engineering Command (NAVFACENGCOM).

Table 1
Drydocks Characteristics Summary
Graving Drydocks

LOCATION	DOCK NO.	SIZE & WATER DEPTH				MEAN TIDE RANGE	SUITABLE FOR DOCKING
		Width (at top of coping)	Length (from head and coping to caisson face)	Depth (over sill at MHW)	Superflood (above MHW)		
Bangor, WA TRIDENT	90' 0"	715' 6"	53' 0"	4' 0"	10.0'	SSBN.
Bayonne, NJ MOT	7	155' 0"	1,092' 0"	47' 0"	...	4.5'	CV. (Leased)
Charleston, SC NSY	1	134' 0"	622' 0"	34' 5"	5' 5"	5.6'	CGN, AS, SSBN.
	2	114' 0"	596' 6"	37' 6"	3' 5"	5.6'	CGN, AS, SSBN.
	3	107' 4"	365' 10"	10' 7"	...	5.6'	Service Craft.
	4	107' 4"	365' 10"	10' 7"	...	5.6'	Service Craft.
	5	140' 0"	751' 4 3/4"	37' 0"	2' 5"	5.6'	CGN, AS, SSBN.
Hunters Point, CA NSY	2	122' 0"	743' 5"	28' 10"	...	4.9'	CG. (Leased)
	3	153' 0"	1,005' 4 1/8"	39' 10 1/4"	...	4.9'	CV. (Leased)
	4	171' 0"	1,092' 0"	50' 5"	...	4.0'	CV. (Leased)
	5	66' 0"	420' 0"	27' 0"	...	4.9'	DD, SS. (Leased)
	6	81' 0"	420' 0"	27' 0"	...	4.9'	DD, SS. (based)
	7	66' 0"	420' 0"	27' 0"	...	4.9'	DD, 32. (Leased)
Long Beach, CA NSY	1	155' 0"	1,093' 6"	44' 3 5/8"	...	4.7'	CV.
	2	104' 0"	687' 6"	37' 1 1/8"	...	4.7'	CG.
	3	104' 0"	687' 6"	38' 0 5/8"	...	4.7'	CG.
Mare Island, CA NSY	1	122' 0"	525' 0"	35' 9"	3' 3"	4.8'	SSBN.
	2	120' 0"	741' 0 3/8"	31' 2"	...	4.8'	CGN, SSBN.
	3	114' 0"	893' 4"	35' 9"	...	4.8'	CGN, SSBN.
	4	104' 0"	435' 8"	22' 8"	...	4.8'	DD, SSN.
Norfolk, VA NSY	1	86' 3 1/2"	325' 4"	25' 8"	...	2.8'	Service Craft.
	2	106' 10"	496' 8"	37' 4 3/4"	6' 4"	2.8'	DD, SSBN.
	3	128' 0"	726' 0"	34' 7"	6' 4"	2.8'	CGN, SSBN.
	4	144' 0"	1,010' 6 1/2"	44' 2"	...	2.8'	CV.
	6	76' 8"	459' 0"	20' 5"	...	2.8'	Service Craft.
	7	76' 8"	458' 0"	20' 5"	...	2.8'	Service Craft.
	8	150' 0"	1,092' 5"	47' 11"	...	2.8'	CVN.
Pearl Harbor, HI NSY	1	138' 0"	1,002' 5"	3' 0"	5' 0"	1.5'	CVA.
	2	147' 0"	1,000' 5 7/8"	46' 6"	...	1.5'	CVA.
	3	104' 0"	497' 6"	22' 6"	6' 0"	1.5'	DD, SSBN.
	4	155' 0"	1,088' 6"	48' 6"	...	1.5'	CVN.
Philadelphia, PA NSY	1	94' 6"	442' 0"	27' 7"	...	5.6'	DD, SS.
	2	140' 2 3/4"	744' 6 7/8"	30' 01/8"	...	5.8'	CA.
	3	144' 0"	1,011' 4"	43' 5"	...	5.6'	CVS, CG.
	4	150' 0"	1,092' 0"	40' 0"	...	5.6'	CV.
	5	150' 0"	1,092' 6"	43' 6"	...	5.8'	CV.
Portsmouth, NH NSY	1	104' 0"	435' 3"	25' 0"	...	8.0'	SSN.
	2	129' 0"	688' 5"	30' 4"	2' 8"	8.0'	SSBN.
	3	71' 0"	486' 0"	37' 0"	3' 8"	8.0'	SSBN.
Puget Sound, WA NSY	1	108' 0"	638' 11"	30' 2"	5' 4'	8.0'	SSN, SSBN.
	2	145' 0"	867' 0"	38' 2"	...	8.0'	CVA, CVS, SSBN.
	3	130' 0"	926' 8"	23' 8"	...	8.0'	DD, SS.
	4	147' 0"	997' 10"	45' 2"	...	8.0'	CV.
	5	147' 0"	1,030' 6"	45' 2"	...	8.0'	CGN, SSBN.
	6	180' 0"	1,151' 11 5/8"	53' 2"	...	8.0'	CVN, Cv.
Roosevelt Roads, Vieques, PR NS	1	155' 0"	1,088' 1"	48' 0"	...	1.0'	Inactive.
San Diego, CA NS	1	104' 4"	693' 6"	36' 6"	...	4.9'	CG.
San Juan, PR	1	99' 9"	654' 5"	28' 0"	...	1.1'	CG, AO. (Leased)

Table 2
Drydocks Characteristics Summary
Marine Railways and Lifts

LOCATION	Capacity (long ton)	Length on	Text Width	Depth over blocks or lift platform at MHW		MEAN TIDE RANGE	SUITABLE FOR DOCKING
				Fore	Aft.		
Annapolis, MD NS Railway	120	72' 0"	36' 0"	9' 2"	9' 11"	0.6'	Station craft and barges.
Patuxent River, MD NAS SESTF Lift	250	Cradle	55' 0"	16' 7"	16' 7"	1.2'	SES. Station Craft.
	60	Cradle	22' 0"	8' 1"	8' 1"	1.2'	
Philadelphia, PA NSY Railway No. 1	2,500	324' 0"	51' 0"	22' 0"	25' 6"	5.6'	SS, DD, FF and Fleet tugs. SS, DD, FF and Fleet tugs.
	2,500	324' 0"	51' 0"	22' 0"	25' 6"	5.6'	

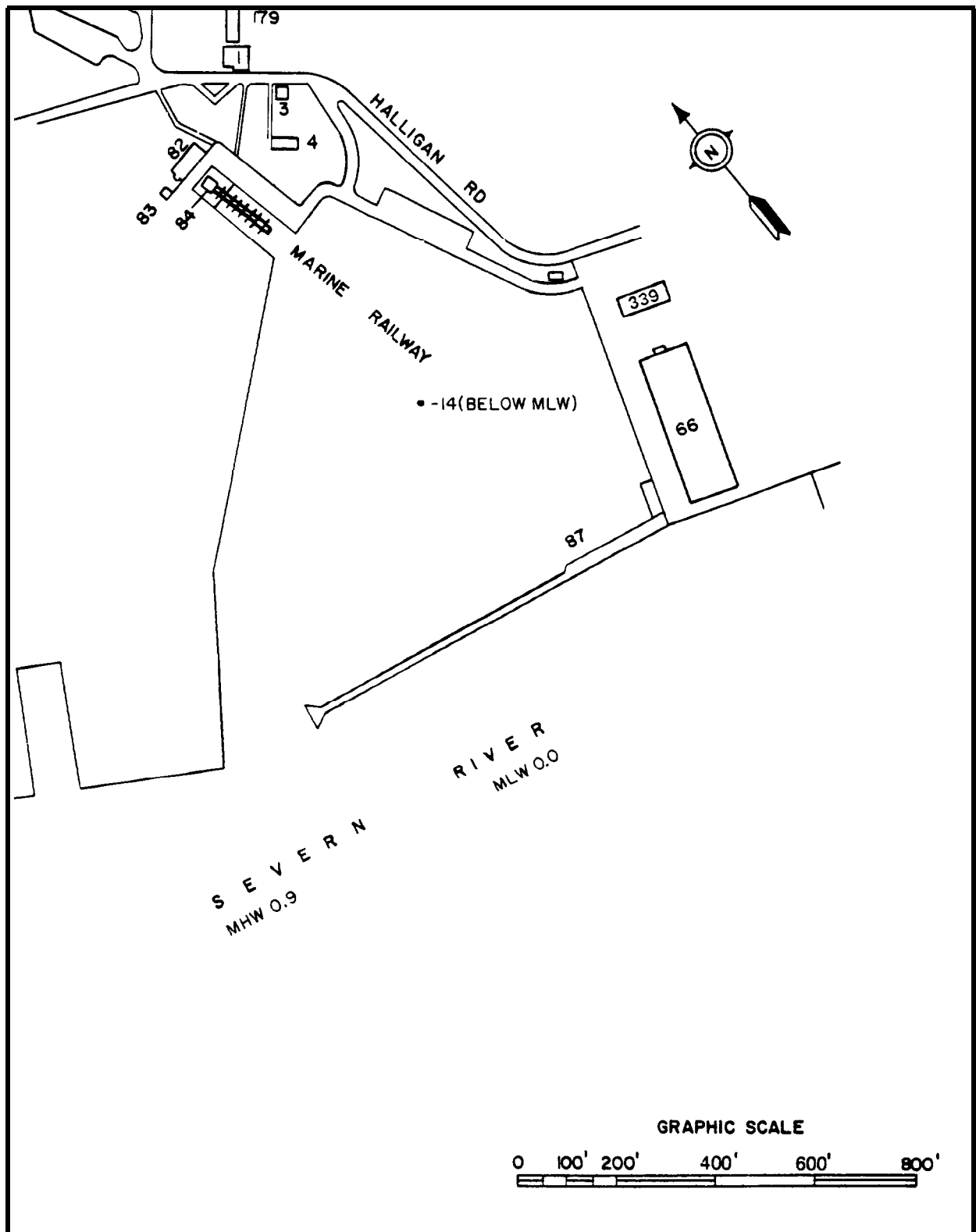


Figure 1
Location of Marine Railway, Annapolis Naval Station, Annapolis, Maryland

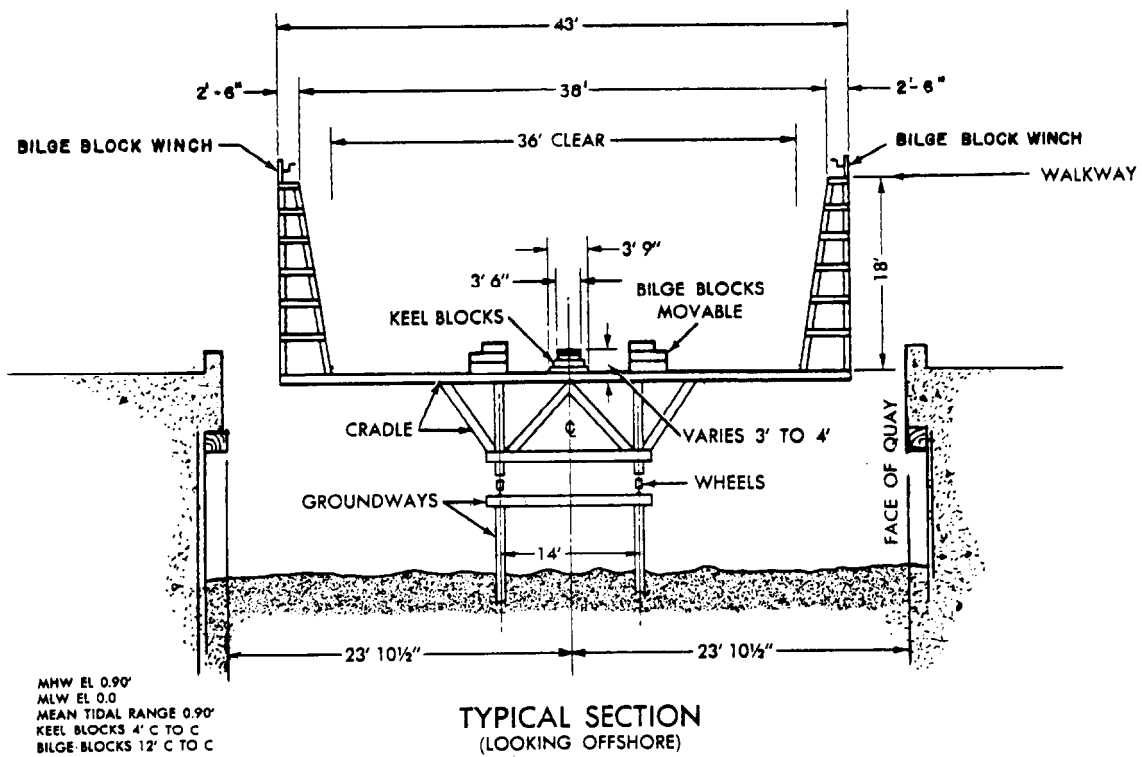
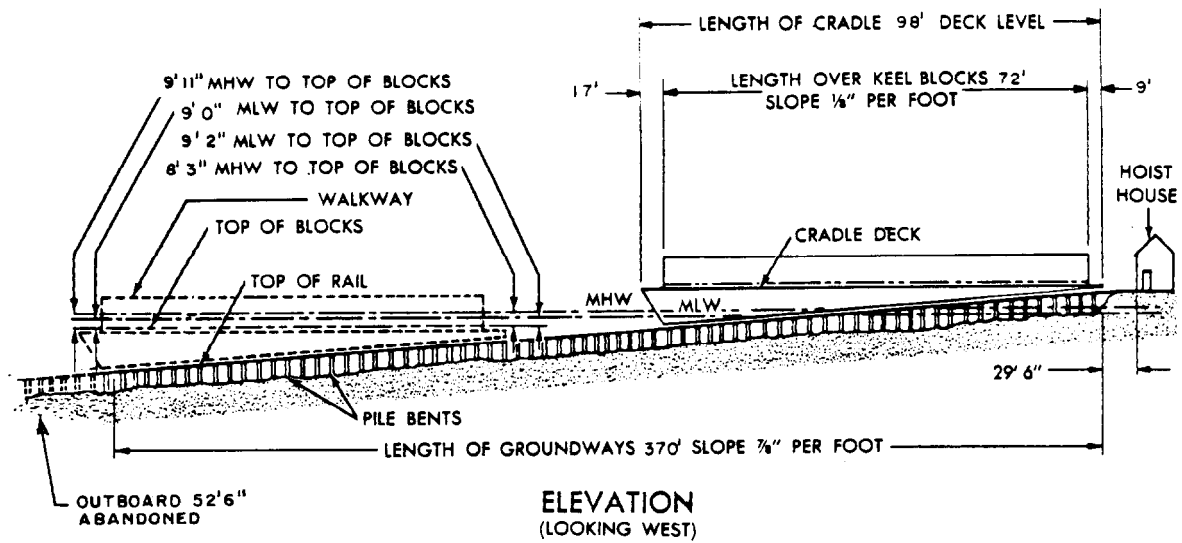


Figure 2
Annapolis Naval Station Marine Railway

Capacity _____	120 lg tons.
For docking _____	Station craft and barges.
Wharf _____	On two sides.
Groundway _____	Foundation- Piles.
	Construction materials- Offshore, wood piles and wood bents. Inshore, concrete and wood.
	Width of track- 14'0" Number of rails- Two.
	Slope of track- 7/8' per ft.
Cradle _____	Slope of deck- Level.
	Slope at top of keel blocks- 1/8' per ft.
	Material- Cradle framing, wood. Superstructure framing, wood.
	Speed- uphaul, 10 fpm; downhaul 10 fpm.
	Wheels- 54, 12" diameter.
Hauling mechanism _____	Motor- 1 electric, 50 hp, 440 v, 3 ph, 60 hz, 40 kw.
	Cables- Uphaul, 2 cables, 1-1/2" diameter.
	Downhaul, one cable, 1" diameter.
Fire protection _____	Station hydrant adjacent to railway.
Steam _____	2" main, one outlet east side.
Compressed air _____	1" main, 75 cfm at 150 psi, three outlets east side, 4 outlets west side.
Cranes _____	Mobile yard.

Figure 2 (continued)
Annapolis Naval Station Marine Railway

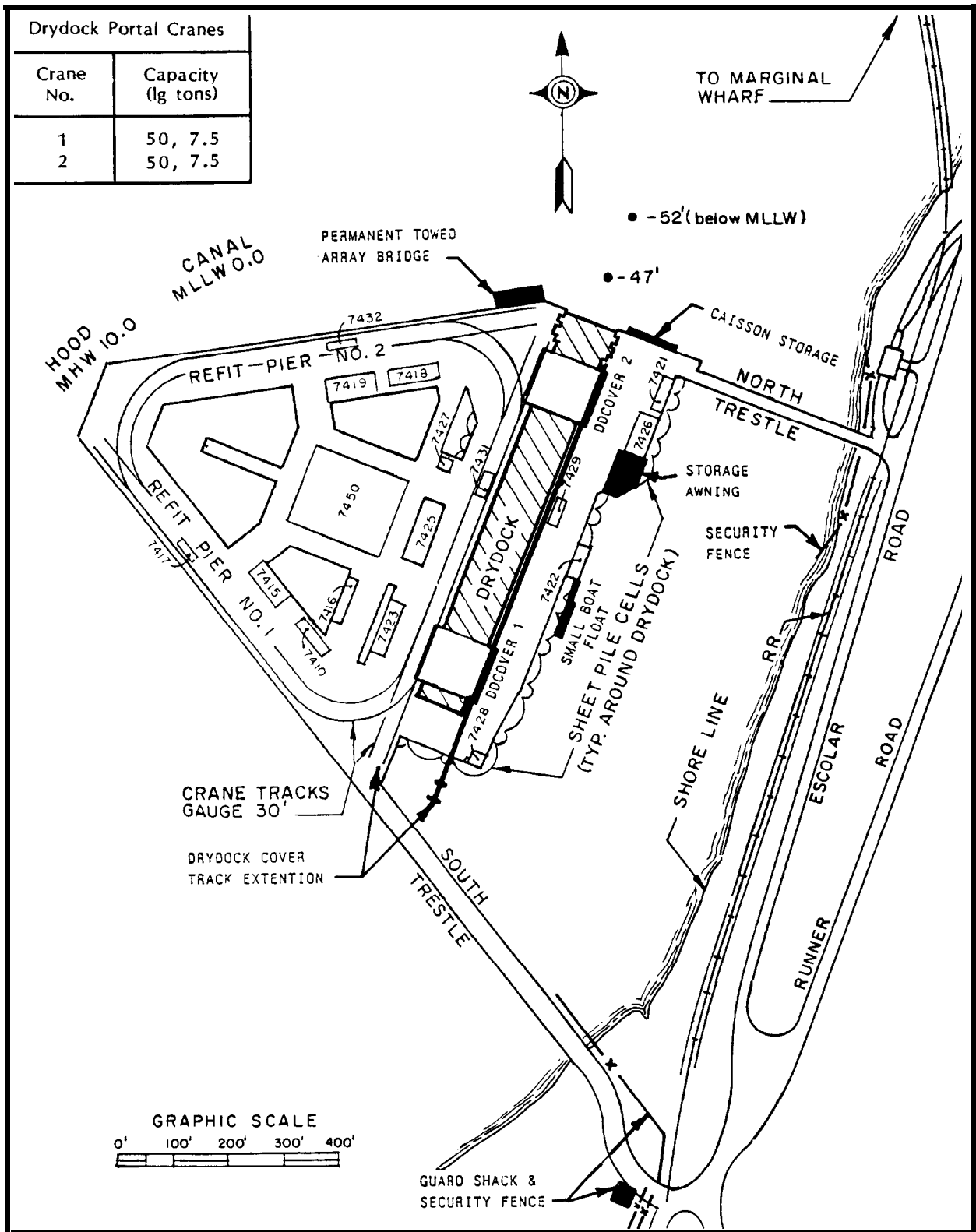


Figure 3
Location of Drydock. Trident Refit Facility, Bangor, Washington

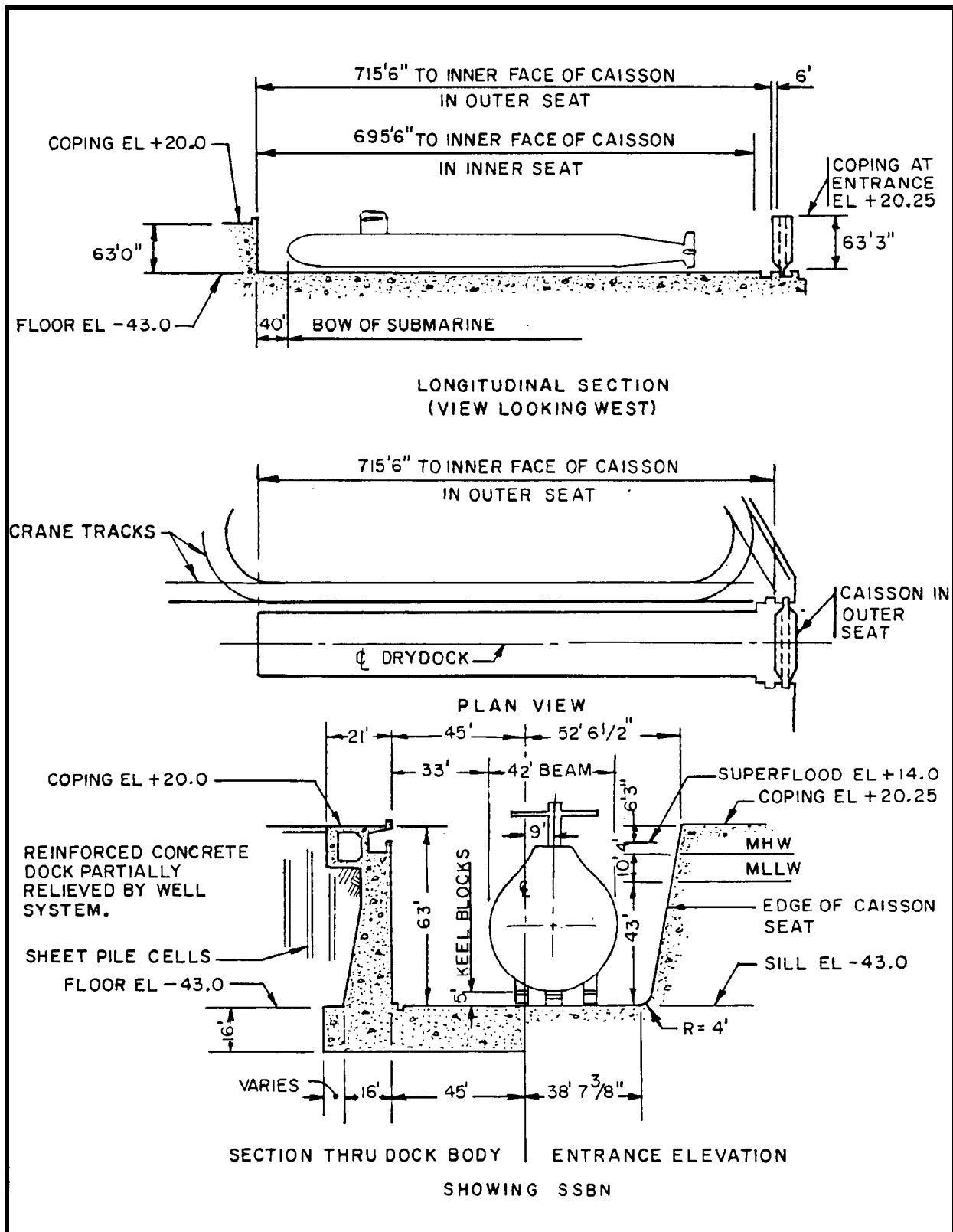


Figure 4
Trident Refit Facility, Bangor Drydock

Date Completed	Suitable for Docking	Foundation	Construction Material
1981	SSBN	Earth	Concrete
Closure _____ Caisson, steel (rectangular box type). Dewatering pumps _____ Three 42",700 hp, 162,000 gpm. One dewatering pump used for superflooding. Time to dewater: 165 min. Drainage pumps _____ Two 12",200 hp, 5,000 gpm. Flooding _____ Through culverts. Time to flood: 60 min. Capstans _____ 9 total: 1 at head, 1 each side of entrance, 3 each side, 30 fpm at 30k.			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main Auxiliary	50 lg tons 7.5 lg tons	94' 9" 135'0'	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	2,000	1 east side and 5 west side at 400 amps; 2 east side and 14 west side at 200 amps; 4 east side at 100 amps.
Ac, 3 Ph, 60 Hz	450	3,200	8 each side at 400 amps.
Ac, 3 Ph, 60 Hz	120/208	1,000	4 west side at 100 amps; 8 west side and 2 east side at 60 amps.
Fresh water _____ 12' mains, 610 gpm at 50 psi, six 1 -1/2' outlets each side. Fire/flushing _____ 12' mains, 3,000 gpm at 125 psi, five 2-1/2' and one water 2' outlets each side. Aux seawater _____ 8' supply and return mains, 1,650 gpm at 80 psi, ten 2-1/2" supply cooling and ten 2-1 /2" return connections west side. Chilled water _____ 6' supply and return mains, 600 gpm at 65 psi, one 6' supply and one 6' return connections west side. Low pressure air _____ 8' mains, 3,000 cfm at 100 psi, forty 1 -1/4' each side. High quality/ _____ 3" main, 800 cfm at 145 psi, eleven 1-1/4" and ten breathing air 3/4" outlets west side Sanitary sewer _____ 4" force mains, 100 gpm at 50 psi, two 2-1/2" inlets each side. Ship overboard _____ 4" force main, 4,600 gpd at 150 psi, two 2-1/2' inlets each side. drain			

Figure 4 (continued)
Trident Refit Facility, Bangor Drydock

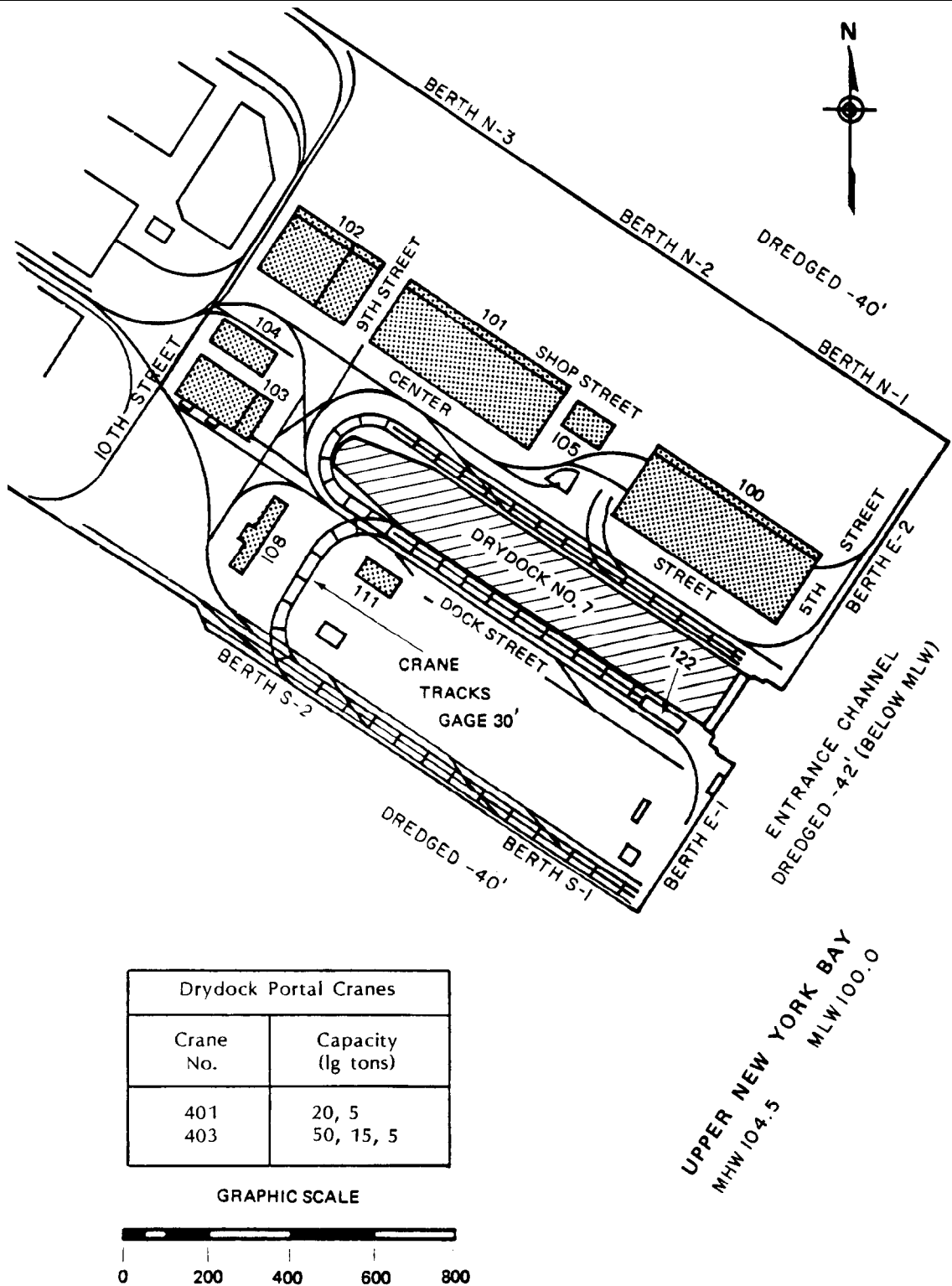


Figure 5
Location of Drydock, Military Ocean Terminal, Bayonne, New Jersey

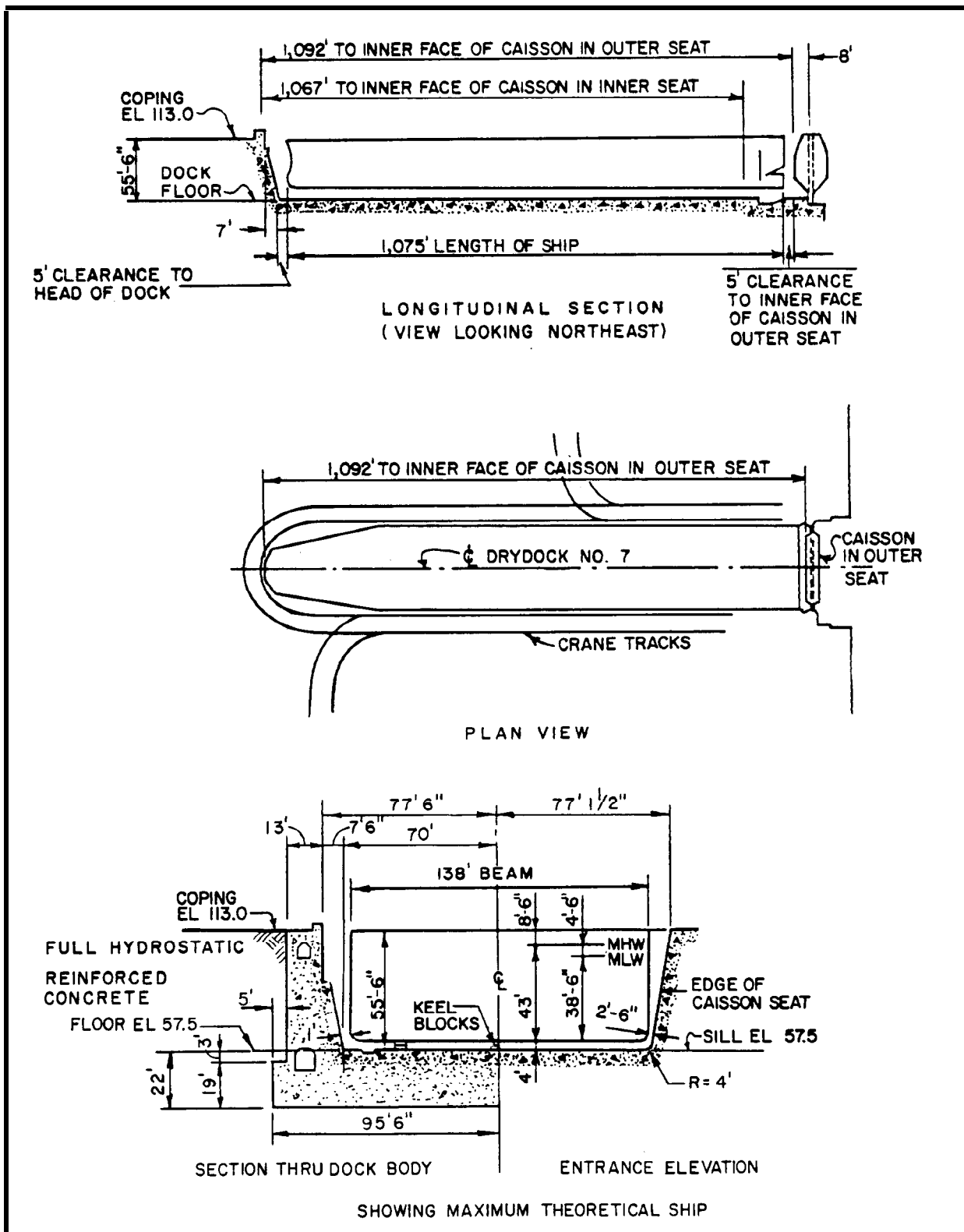


Figure 6
Military Ocean Terminal **Drydock** No. 7

Date Completed	Suitable for Docking	Foundation	Construction Material
1942	CV	Earth	Concrete
<div>Closure _____ Caisson, steel (rectangular box type).</div> <div>Dewatering pumps _____ Four 54", 1,200 hp, 520,000 gpm.</div> <div>Time to dewater: 200 min.</div> <div>Drainage pumps _____ Two 16', 250 hp, 19,000 gpm.</div> <div>Flooding _____ Through culverts. Time to flood: 150 min.</div> <div>Capstans _____ 16 total: 1 at head, 1 each side of entrance, 30 fpm</div> <div>at 24k; 6 each side. 1 at Berth E-1. 30 fpm at 12k.</div>			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main	50 lg tons	93'4	
Auxiliary	15 lg tons	137'6'	
Whip	5 lg tons	139'61", 80' min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	4,160	400	2 south side at 200 amps.
Ac, 3 Ph, 60 Hz	460	1,600	8 north side at 400 amps.
Ac, 3 Ph, 60 Hz	460	1,600	6 south side at 400 amps.
<div>Fresh water _____ 6' mains, 3,000 gpm at 50 psi, nine 2-1/2' and three 1-1/2" outlets north side, eight 2-1/2' and four 1-1/2' outlets south side.</div> <div>Salt water _____ 8' mains, 5,000 gpm at 110 psi, eleven 2-1/2' and four 1-1/2' outlets north side, four 6', eleven 2-1/2' and three 1-1/2" outlets south side.</div> <div>Fire protection _____ Same as saltwater.</div> <div>Compressed air _____ 6' mains, 1,800 cfm at 100 psi, twelve 2' and eighteen 1-1/2" outlets each side.</div> <div>Steam _____ 6' mains, 15,000 phr at 125 psi, five 2 outlets north side, six 2' outlets south side, three 1-1/2" outlets each side.</div> <div>Sanitary sewer _____ 8' mains, 1,000 gpm, twenty-seven 6" inlets each side.</div>			

Figure 6 (continued)
Military Ocean Terminal Drydock No. 7

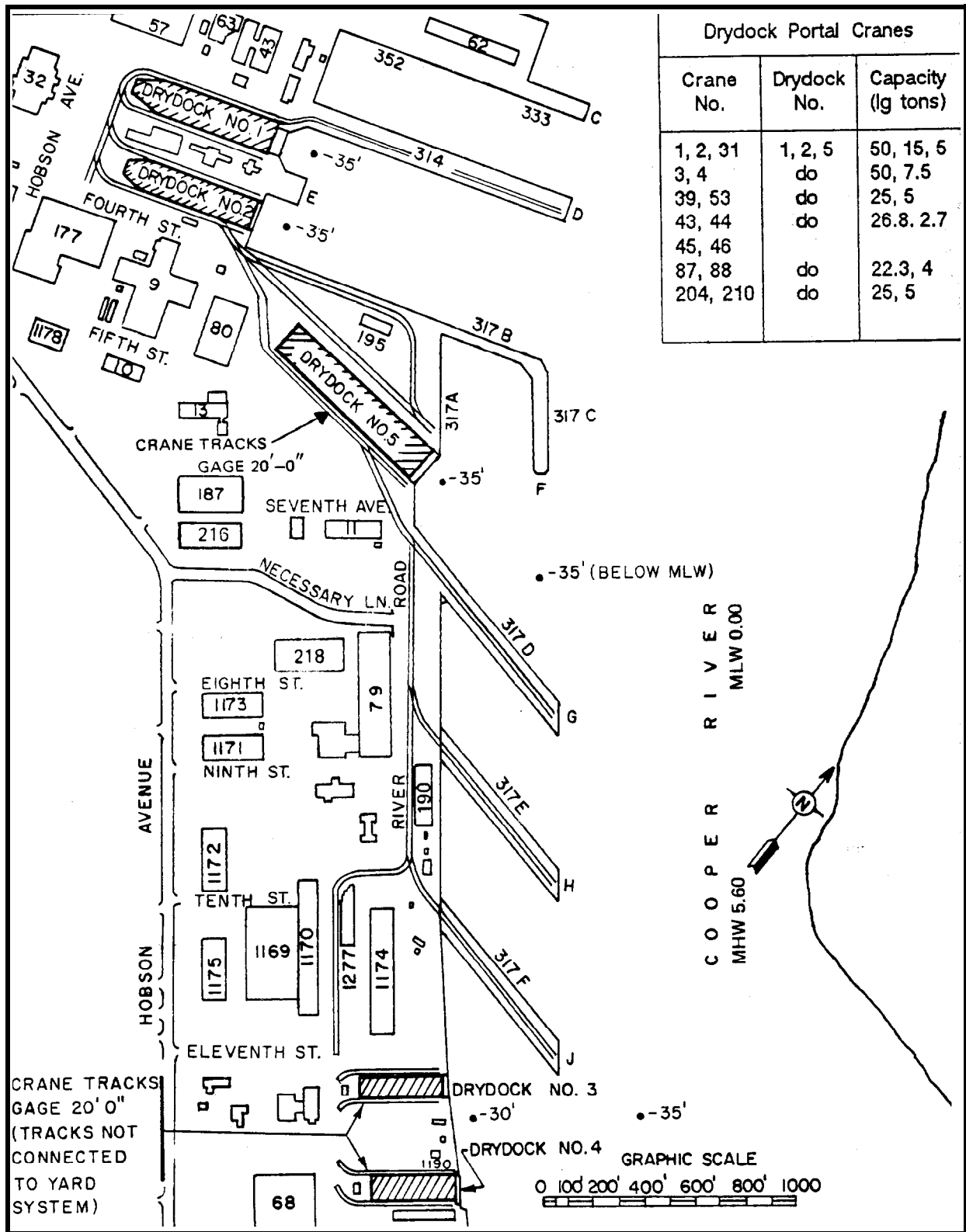


Figure 7
Location of Drydocks, Charleston Naval Shipyard, Charleston, South Carolina

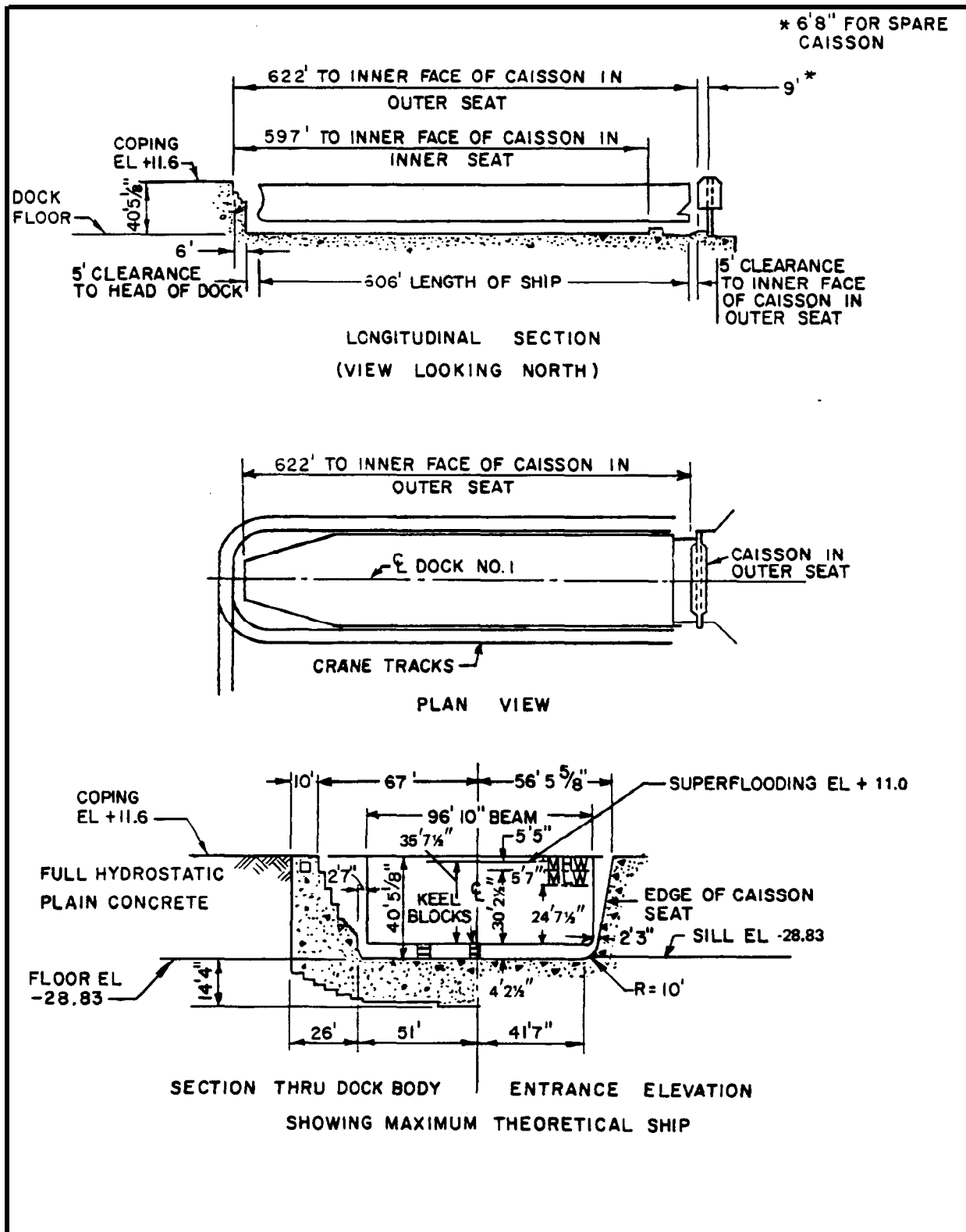


Figure 8
Charles ton Naval Shipyard Drydock No. 1

Date Completed	Suitable for Docking	Foundation	Construction Material
1908	CGN, AS, SSBN	Earth	Concrete and granite
Closure _____ Caisson, steel (fin keel type). Spare caisson, steel (rectangular box type), also used for Drydock No. 2.			
Dewatering pumps _____	Four 36", 300 hp, 140,000 gpm. Also connected to Drydock No. 2 pumphouse.		
	Time to dewater 120 min.		
Drainage pumps _____	Two 12", 70 hp, 10,000 gpm.		
Flooding _____	Through caisson. Time to flood; 90 min. superflooding through caissons: 1979 caisson: 2 pumps, 30", 125 hp, 50,000 gpm		
	1942 caisson: 2 pumps, 30', 125 hp, 36,000 gpm		
	1908 caisson: 2 pumps, 30', 125 hp, 50,000 gpm		
Capstans _____	7 total: 1 at head, 63 fpm at 6.7k 1 each side of entrance, 1 each side, 17 fpm at 12k; 1 each side, 28 fpm at 7.3k. Winches: 2 total at head, 30 fpm at 12k.		
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main Auxiliary	50 lg tons 7.5 lg tons	120' o" 158' 0"	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	13,200	400	1 north side at 400 amps.
Ac, 3 Ph, 60 Hz	460	1,500	5 no., 3 so. at 250 amps.
Ac, 3 Ph, 60 Hz	460	2,400	1 north side and 2 south side at 1,200 amps.
Ac, 3 Ph, 60 Hz	460	400	1 south side at 400 amps.
Fresh water _____	6" mains, 1300 gpm at 50 psi, three 3", four 2-1/2", thirteen 1-1/2" and two 3/4' outlets north side, four 2-1/2 and twelve 1-1/2' outlets south side.		
Salt water _____	8' mains, 2,400 gpm at 125 psi, one 4" and fifteen 2-1/2' outlets north side, one 4', eighteen 2-1/2" and one 1-1/2" outlets south side.		
Fire protection _____	Same as salt water and fresh water.		
Compressed air _____	3' mains, 1,600 cfm at 95 psi, eight 1-1/4" and four 1" outlets north side, one 1-1/2", eight 1-1/4", seven 1" and one 3/4" outlets south side. 6" headers at dock floor with outlets.		
Steam _____	6' and 8 main, 3,200 phr at 165 psi, twelve 1-1/2' outlets north side.		
Sanitary sewer _____	8' main, 300 gpm, fourteen 4' inlets each side.		

Figure 8 (continued)
Charleston Naval Shipyard Drydock No. 1

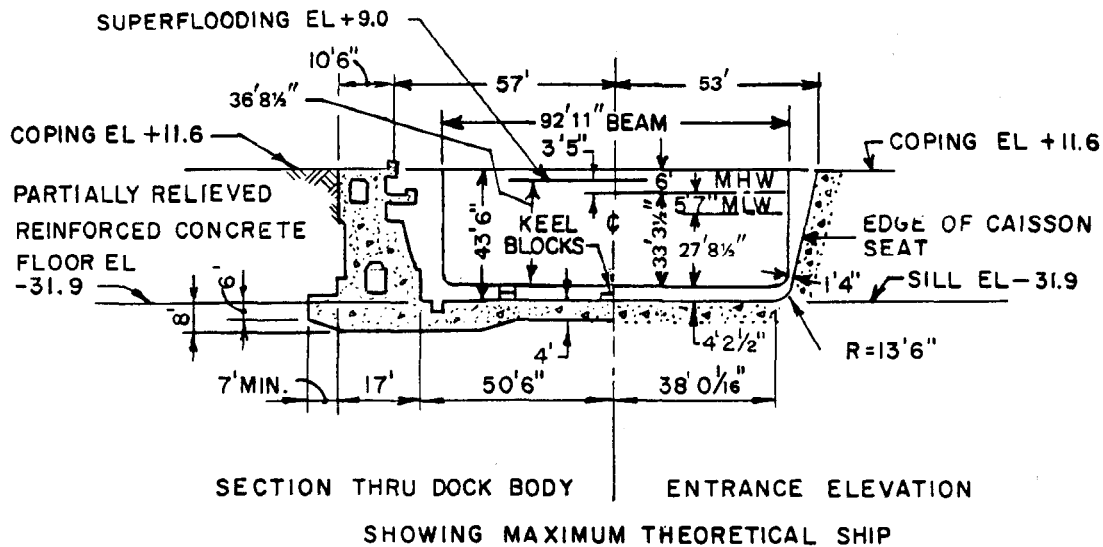
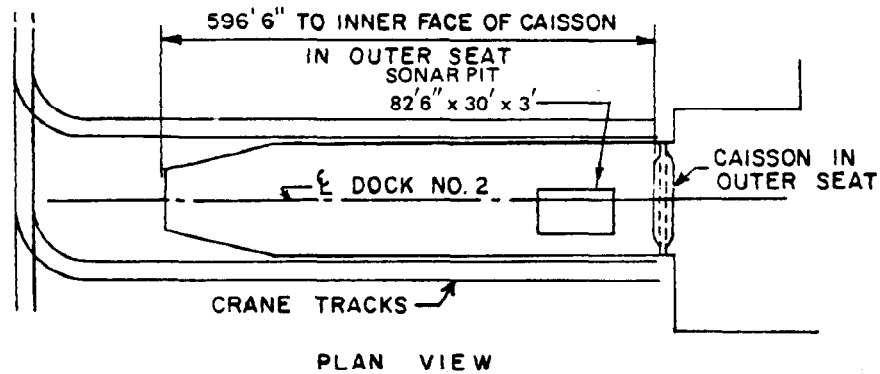
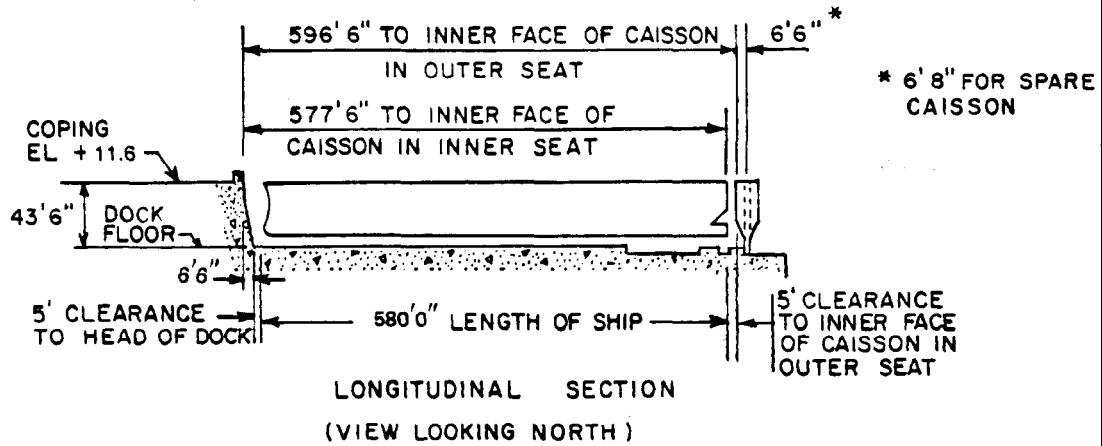


Figure 9
Charles ton Naval Shipyard Drydock No. 2

Date Completed	Suitable for Docking	Foundation	Construction Material
1968	CGN, AS, SSBN	Earth	Concrete
Closure _____	Caisson, steel (rectangular box type). Spare caisson, steel (rectangular box type), also used for Drydock No. 1.		
Dewatering pumps _____	Two 48", 550 hp, 166,000 gpm. Also connected to Drydock No. 1 pumphouse. Time to dewater: 165 min.		
Drainage pumps _____	Two 16", 150 hp, 14,000 gpm. Also connected to Drydock No. 1 pumphouse.		
Flooding _____	Through caisson. Time to flood: 60 min. superflooding through caissons: 1979 caisson: 2 pumps, 30", 125 hp, 50,000 gpm 1942 caisson: 2 pumps, 30", 125 hp, 36,000 gpm		
Capstans _____	8 total: 2 each side of entrance, 1 south side, 30 fpm at 24k 3 north side, 2 south side, 30 fpm at 12k. Winches: 2 total at head, 30 fpm at 12k.		
Portal 'Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main Auxiliary	50 lg tons 7.5 lg tons	128' 0" 164' 0"	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	13,200	400	1 north side at 400 amps.
Ac, 3 Ph, 60 Hz	460	2,750	11 north side and 7 south side at 250 amps.
Ac, 3 Ph, 60 Hz	460	2,400	1 each side at 1,200 amps.
F r e s h w a t e r _ _	6" mains, 2,080 gpm at 50 psi, one 3", four 2-1/2", eight 1-1/2' and one 3/4" outlets north side, eight 2-1/2', fifteen 1-1/2' and two 3/4' outlets south side.		
Salt water _____	6" mains, 2,000 gpm at 125 psi, twenty-six 2-1/2" outlets each side.		
Fire protection _____	Same as salt water and fresh water.		
Compressed air _____	6" mains, 2,000 cfm at 95 psi, one 4' and ten 1-1/4 outlets north side, one 3, six 1-1/2", twenty 1-1/4" and eleven 3/4" outlets south side.		
Steam _____	6' mains, 12,000 phr at 165 psi, eight 1-1/2 outlets north side, seven 1-1/2' and two 3/4 outlets south side.		
Sanitary sewer _____	8' south side main, 200 gpm, twenty 4" inlets each side.		

Figure 9 (continued)
Charles ton Naval Shipyard Drydock No. 2

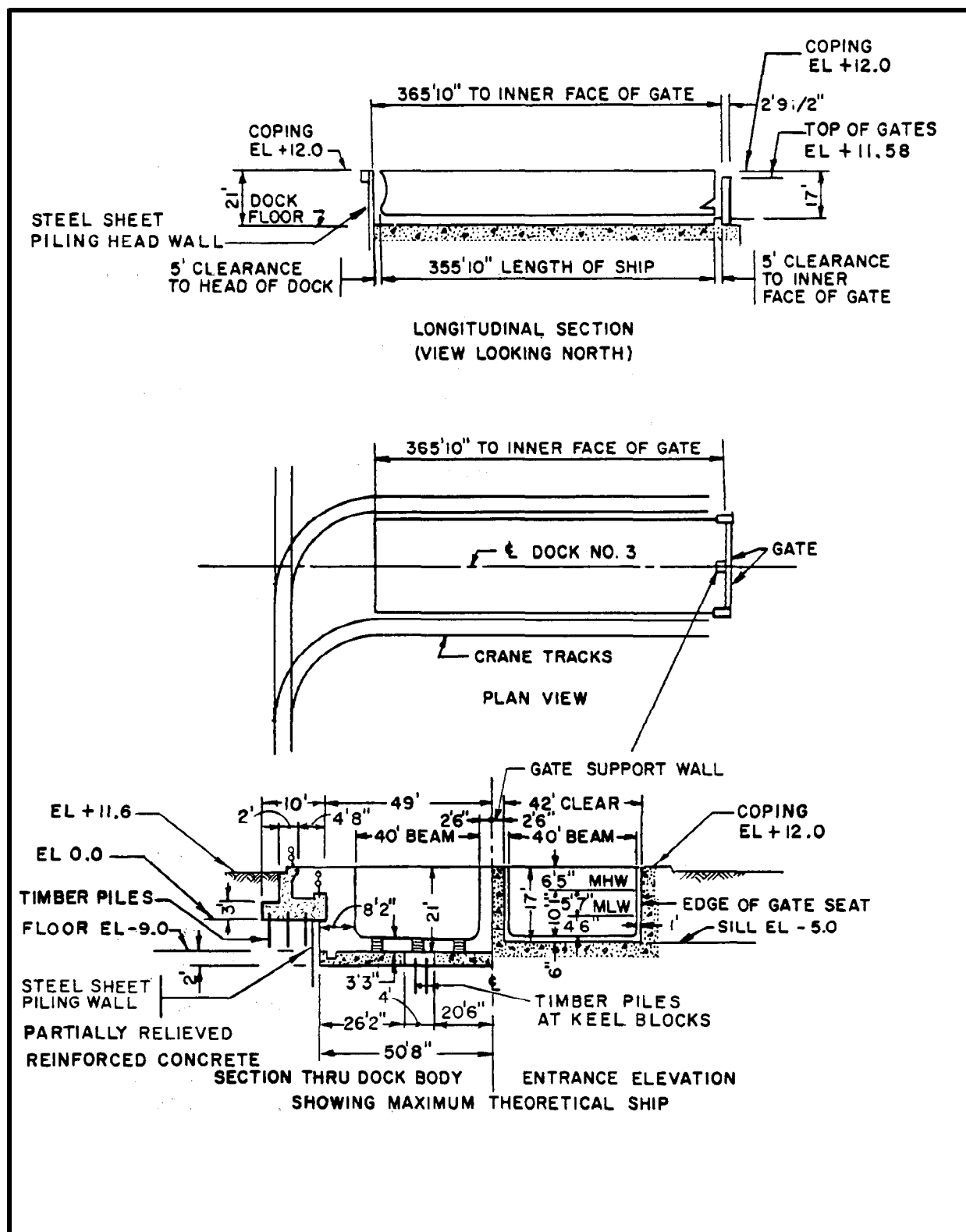


Figure 10
Charleston Naval Shipyard Drydock No. 3

Date Completed	Suitable for Docking	Foundation	Construction Material
1943		Earth & Piles	Concrete & Sheet Pile
Item	Data		
Closure _____	Two gates, steel and timber (vertical lift).		
Dewatering pumps _____	Two 18", 60 hp, 12,000 gpm. Pumps also used for Drydock No. 4. Time to dewater: 8 hours.		
Drainage pumps _____	Two 8', 30 hp, 3,000 gpm. Pumps also used for Drydock No. 4.		
Flooding _____	Through gates. Time to flood: 120 min.		
Portal Crane Maximum Capacities and Heights			
Portal cranes not currently used at this drydock.			
Ship and Industrial Services Furnished at Dock			
Item	Data		
Fresh water _____	6' mains, (blanked at head of dock) at center and each side, 1,050 gpm at 50 psi.		
Fire protection _____	Two hydrants each side, 3,000 gpm at 120 psi.		
Compressed air _____	5" mains (blanked at head of dock) at center and each side, 1,500 cfm at 90 psi, one 1-1/2' outlet south side at head of dock.		

Figure 10 (continued)
Charles ton Naval Shipyard Drydock No. 3

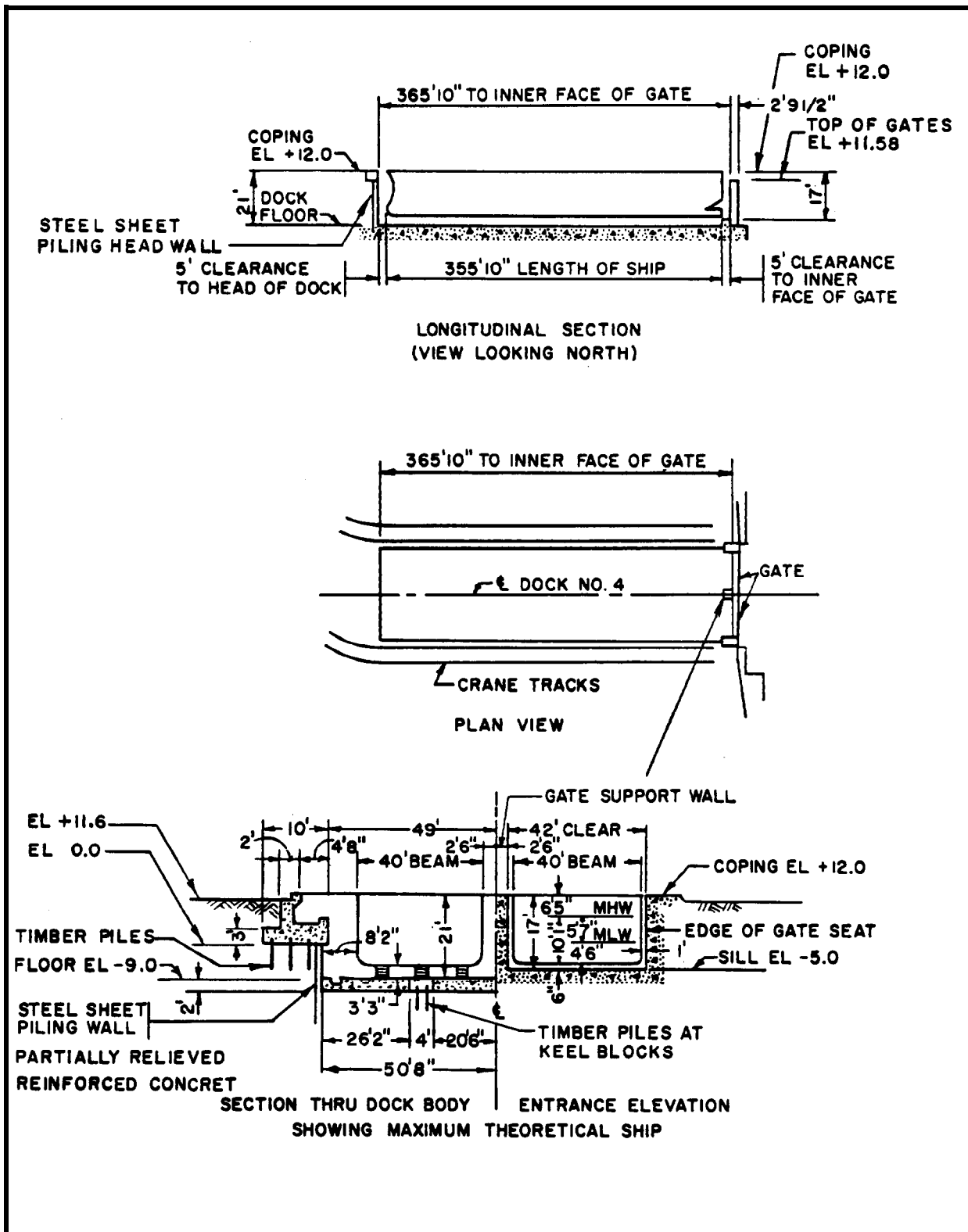


Figure 11
Charleston Naval Shipyard Drydock No. 4

Date Completed	Suitable for Docking	Foundation	Construction Material
1943	Service Craft	Earth & Piles	Concrete & Sheet Pile
Item	Data		
Closure _____	Two gates, steel and timber (vertical lift).		
Dewatering pumps _____	Two 18", 60 hp, 12,000 gpm. Pumps also used for Drydock No. 3. Time to dewater 8 hours.		
Drainage pumps _____	Two 8', 30 hp, 3,000 gpm. Pumps also used for Drydock No. 3.		
Flooding _____	Through gates. Time to flood: 120 min.		
Portal Crane Maximum Capacities and Heights			
Portal cranes not currently used at this drydock.			
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	2 0 0	1 at head of dock at 200 amps.
Item	Data		
Fresh water _____	6' mains, (blanked at head of dock) at center and each side, 1,050 gpm at 50 psi, one 2-1/2' outlet south side at head of dock.		
Fire protection _____	Two hydrants each side, 3,000 gpm at 120 psi.		
Compressed air _____	5" mains (blanked at head of dock) at center and each side, 1,500 cfm at 90 psi.		

Figure 11 (continued)
Charles ton Naval Shipyard Drydock No., 4

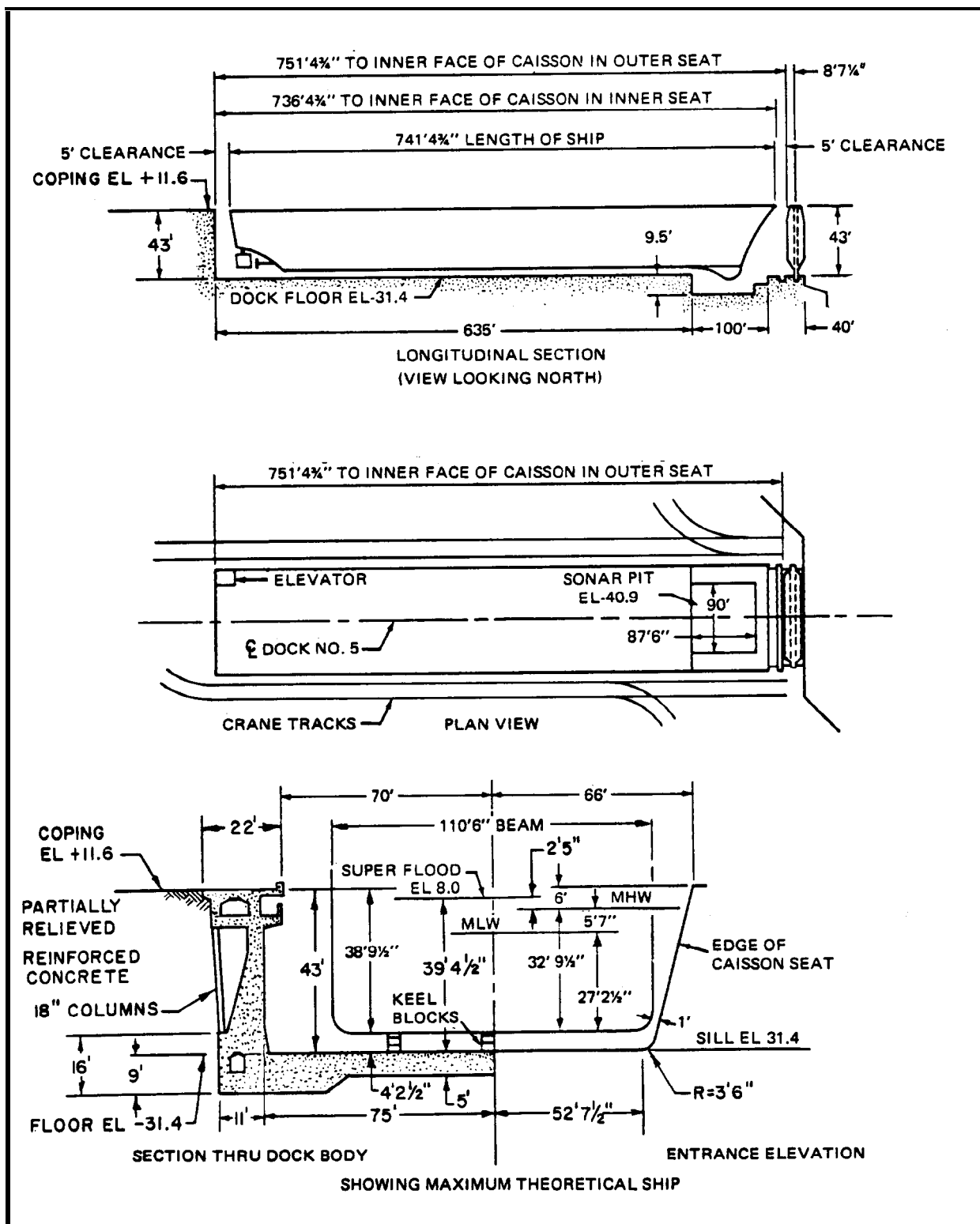


Figure 12
Charles ton Naval Shipyard Drydock No. 5

Date Completed	Suitable for Docking	Foundation	Construction Material
1984	CGN, AS, SSBN	Earth	Concrete
Closure _____ Dewatering pumps _____ Drainage pumps _____ Flooding _____ Capstans _____	Caisson, steel (rectangular box type). Three 42", 700 hp, 195,000 gpm. Time to dewater 180 min. Two 14", 250 hp, 20,000 gpm. Through culverts. Time to flood: 50 min. Superflooding pumps: three 30", 125 hp, 83,000 gpm. 8 total: 1 each side of entrance, 30 fpm at 24k; 3 each side, 30 fpm at 12k. Winches: 3 total at head, 30 fpm at 12k.		
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main Auxiliary	50 lg tons 7.5 lg tons	113'0" 153'0"	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	12,000	11 north side and 19 south side at 400 amps.
Fresh water _____ Salt water _____ Fire protection _____ Compressed air _____ Steam _____ Oxygen _____ Sanitary sewer _____ MAPP gas _____	8' mains, 2,000 gpm at 50 psi, four 2-1/2 and twelve 1-1/2" outlets each side. 14' mains, 5,400 gpm at 130 psi, sixteen 2-1/2 outlets each side. 10' mains, 3,500 gpm at 125 psi, eight 4" and eight 2-1/2" outlets each side. 8 mains, 5,000 cfm at 95 psi, four 2-1/2' and thirty-six 1 -1/4' outlets each side. 6' headers at dock floor with outlets. 6' mains, 60,000 phr at 165 psi, eight 1 -1/2" and eight 1" outlets each side. 3" mains, 85 cfm at 250 psi, seven 1" outlets each side. 8" south side main, 300 gpm, eight 4" inlets on centerline and each side. 4" mains, 100 cfm at 12 psi, seven 1" outlets each side.		

Figure 12 (continued)
Charles ton Naval Shipyard Drydock No. 5

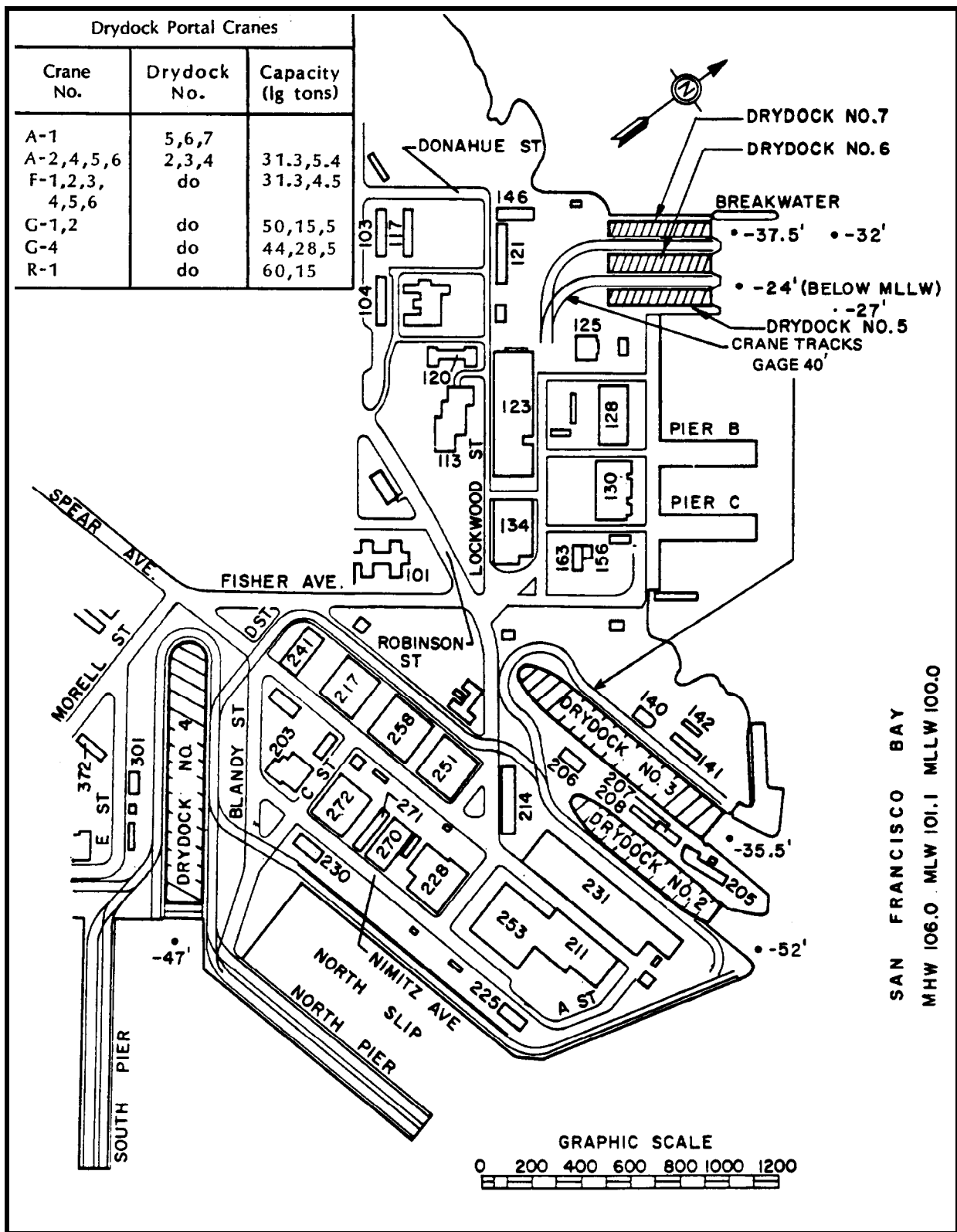


Figure 13
Location of Drydocks, Hunters Point Naval Shipyard, San Francisco, California

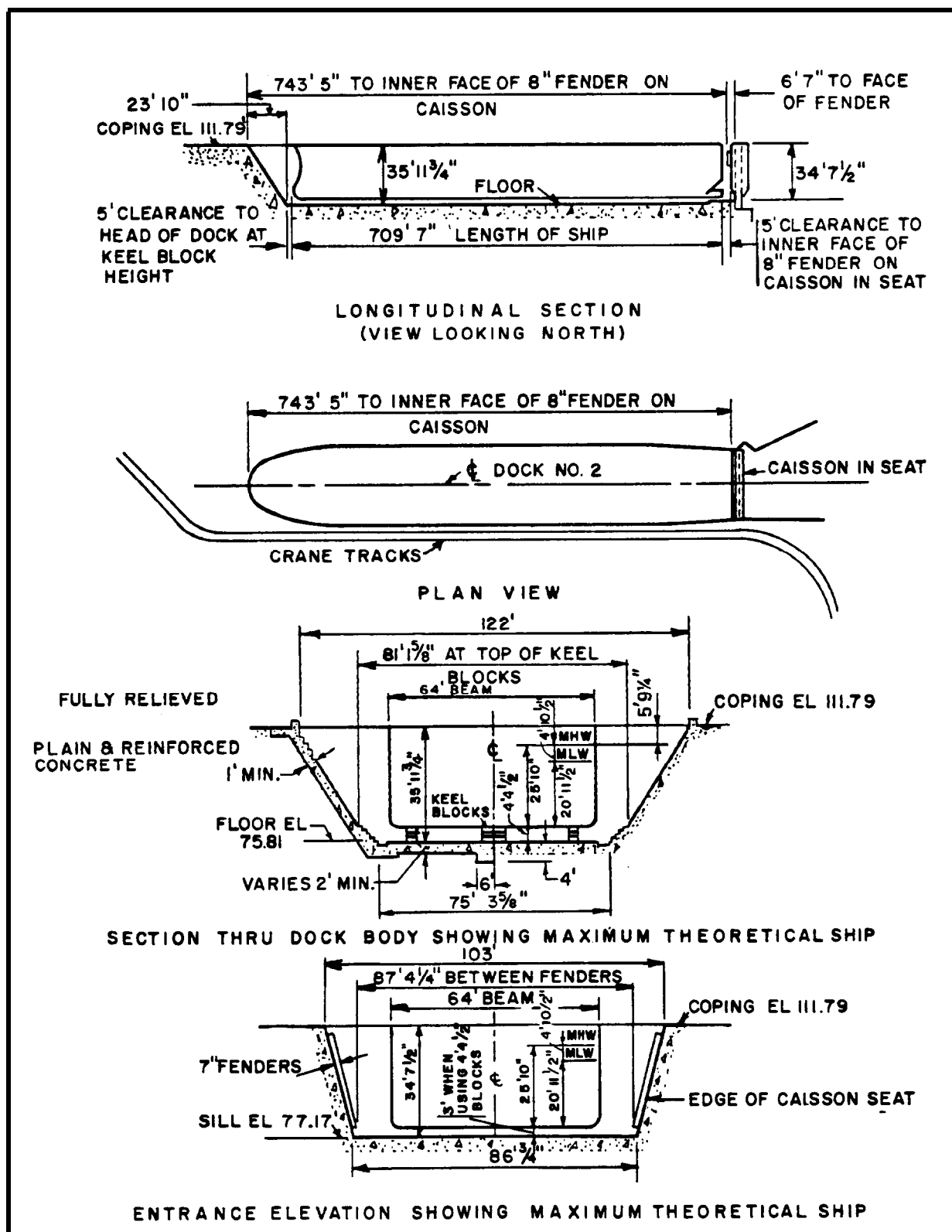


Figure 14
Hunters Point Naval Shipyard Drydock No. 2

Date Completed	Suitable for Docking	Foundation	Construction Material
1903	CG	Rock	Concrete
<div>Closure _____ Caisson, steel (rectangular box type).</div> <div>Dewatering pumps _____ Three 33", 400 hp, 165,000 gpm. Time to dewater 150 min.</div> <div>Drainage pumps _____ Two 8', 40 hp, 3,200 gpm.</div> <div>Flooding _____ Through caisson. Time to flood: 90 min.</div> <div>Capstans _____ 8 total: 1 at head, 30 fpm at 36k; 1 each side of entrance, 1 south side, 12 fpm at 35k; 1 each side, 12 fpm at 30k; 2 north side, 30 fpm at 10k.</div>			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main	44 lg tons	121'0"	
Auxiliary	28 lg tons	185'0"	
Whip	5 lg tons	200'0", 90'0" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
AC, 3 Ph, 60 Hz	460	4,800	1 each at 1,600 amps; 3 north side at 800 amps; 2 north side at 200 amps.
<div>Fresh water _____ 6' mains, 250 gpm at 40 psi, six 2-1/2' and four 1-1/2" outlets each side.</div> <div>Salt water _____ 8' mains, 2,000 gpm at 100 psi, six 4" and ten 2-1/2" outlets each side. 3" headers at dock floor with outlets.</div> <div>Fire protection _____ Same as salt water.</div> <div>Compressed air _____ 6" mains, 3,000 cfm at 100 psi, six 3' outlets each side. 3" headers at dock floor with outlets.</div> <div>Steam _____ 6' mains, 30,000 phr at 100 psi, six 3' outlets each side.</div> <div>Oxygen _____ 1-1/4' main, 100 psi, one 1-1/4" and five 1" outlets north side.</div> <div>Acetylene _____ 1-1/4' main, 10 psi, one 1-1/4' and five 1" outlets north side.</div> <div>Sanitary sewer _____ 10' mains, 500 gpm, eleven 6' inlets each side.</div> <div>Natural gas _____ 3" main, 15 psi, four 2' outlets north side, three 2-1/2" and one 2' outlet south side.</div>			

Figure 14 (continued)
 Hunters Point Naval Shipyard Drydock No. 2

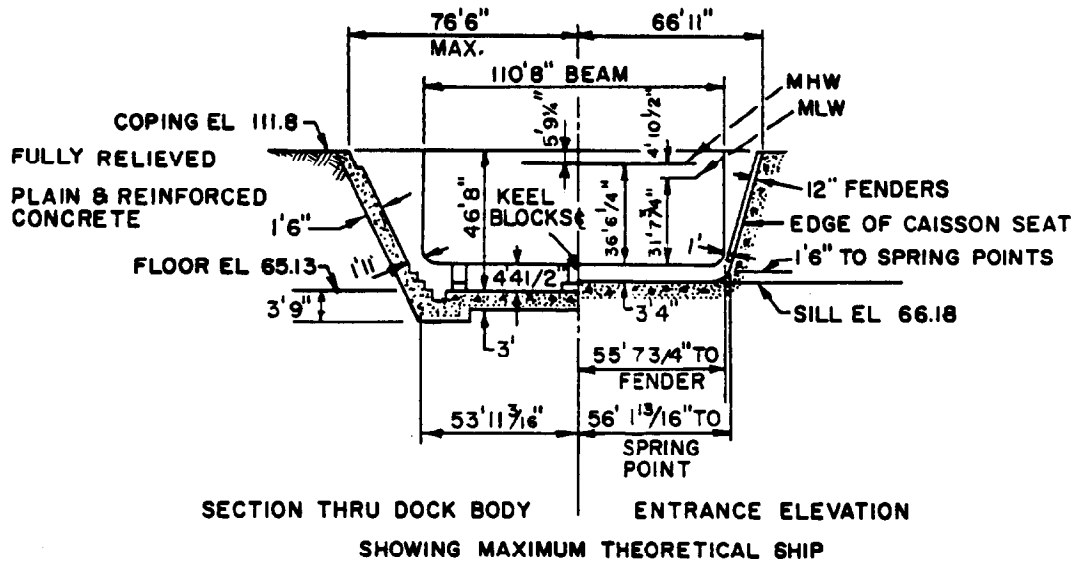
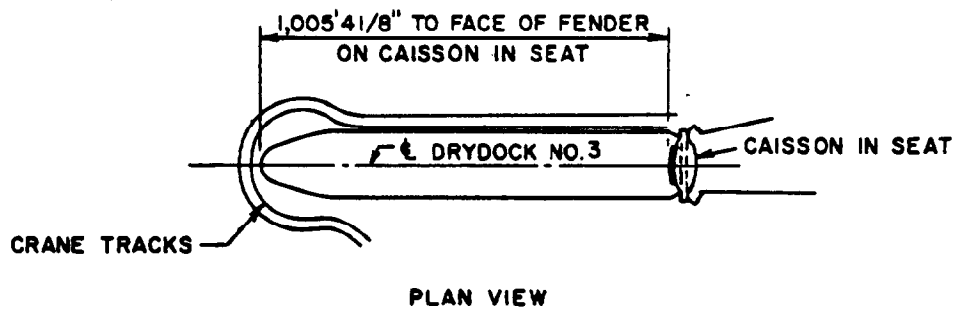
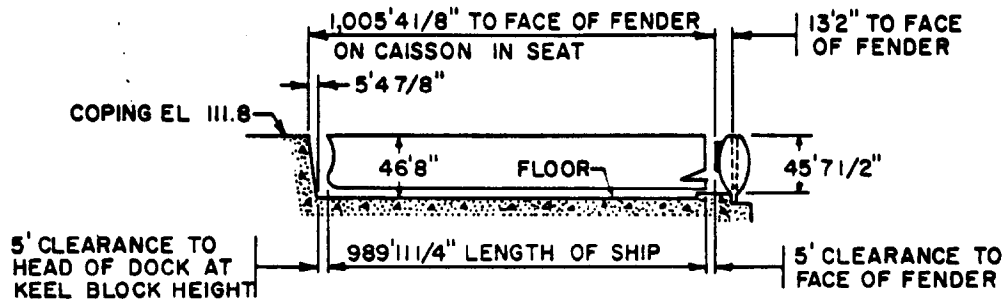


Figure 15
Hunters Point Naval Shipyard Drydock No. 3

Date Completed	Suitable for Docking	Foundation	Construction Material
1919	CV	Rock	Concrete
<p>Closure _____ Caisson, steel (ship type).</p> <p>Dewatering pumps _____ Four 48", 750 hp, 575,000 gpm. Time to dewater: 150 min.</p> <p>Drainage pumps _____ Two 16', 100 hp, 8,500 gpm.</p> <p>Flooding _____ Through caisson, Time to flood: 90 min.</p> <p>Capstans _____ 9 total: 1 at head, 30 fpm at 30k; 1 each side of entrance, 3 each side, 30 fpm at 14k.</p>			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main	44 lg tons	102'0"	
Auxiliary	28 lg tons	176'0"	
Whip	5 lg tons	193'8", 90' 0" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	9,800	4 north side at 1,600 amps; 1 north side at 1,400 amps; 5 north side at 400 amps; 1 south side at 1,600 amps.
<p>Fresh water _____ 4" and 6" mains, 300 gpm at 40 psi, twelve 2-1/2" and two 1-1/2" outlets north side, ten 2-1/2" and four 1-1/2" outlets south side.</p> <p>Salt water _____ 8" mains, 2,500 gpm at 100 psi, fourteen 4" and four 2-1/2" outlets each side. 4" headers at dock floor with outlets.</p> <p>Fire protection _____ Same as salt water.</p> <p>Compressed air _____ 6" mains, 3,000 cfm at 100 psi, eight 3" outlets each side. 3" headers at dock floor with outlets.</p> <p>Steam _____ 6" mains, 20,000 phr at 100 psi, eight 3 outlets each side.</p> <p>Oxygen _____ 1-1/2" main, 100 psi, four 1" outlets south side.</p> <p>Acetylene _____ 1-1/2" main, 10 psi, four 1" outlets south side.</p> <p>Sanitary sewer _____ 10" mains, 500 gpm, fifteen 6" inlets each side.</p> <p>Natural gas _____ 3" mains, 15 psi, four 2-1/2" outlets each side.</p>			

Figure 15 (continued)
Hunters Point Naval Shipyard Drydock No. 3

Date Completed	Suitable for Docking	Foundation	Construction Material
1942	CV	Rock	Concrete
Item	Data		
Closure _____	Caisson, steel (rectangular box type).		
Dewatering pumps_	Three 46", 1,500 hp, 390,000 gpm. Time to dewater: 150 min.		
Drainage pumps____	Two 16', 150 hp, 13,000 gpm.		
Flooding_____	Through culverts. Time to flood: 60 min.		
Capstans_____	13 total: 1 at head, 2 each side of entrance, 76 fpm at 33k; 5 each side, 76 fpm at 13k.		
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main	44 lg tons	82' 9"	
Auxiliary	28 lg tons	169' 8"	
Whip	5 lg tons	188' 8", 90' 0" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	12,800	2 each side at 3,200 amps; 4 each side at 1,600 amps.
Ac, 3 Ph, 60 Hz	4,160	1,734	5 at 400 amps each on north side
Fresh water _____	6' mains, 400 gpm at 40 psi, eight 2-1/2" and four 1-1/2" outlets each side.		
Salt water _____	[8" mains, 2,000 gpm at 100 psi, six 4" outlets each side, 4" headers at dock floor with outlets: Not operational].		
Fire protection _____	10" and 12' mains, 12,500 gpm at 150 psi, sixteen 4", four 6" outlets each side.		
Low pressure air _____	6" mains, 8,000 cfm at 100 psi, six 3" outlets each side. 3" headers at dock floor with outlets.		
High pressure air _____	1" mains, 160 cfm at 3,000 psi, [one 1" outlet south side not operational].		
Steam _____	6" mains, 24,000 phr at 150 psi, six 3" outlets north side, [five 3" outlets south side, not operational]: Provided by rental boilers (portable).		
Oxygen _____	[2" mains, 1,000 cfm at 100 psi, six 1" outlets each side: Not operational].		
Acetylene _____	2" mains, 1,000 cfm at 5 psi, six 1" outlets each side: Not operational].		
Sanitary sewer _____	8' mains, 500 gpm, two 4" inlets each side.		
Natural gas _____	[4' mains, 15 psi, one 1" outlet each side, three 2-1/2' north side, four 2-1/2' south side: Not operational].		

Figure 16 (continued)
Hunters Point Naval Shipyard Drydock No. 4

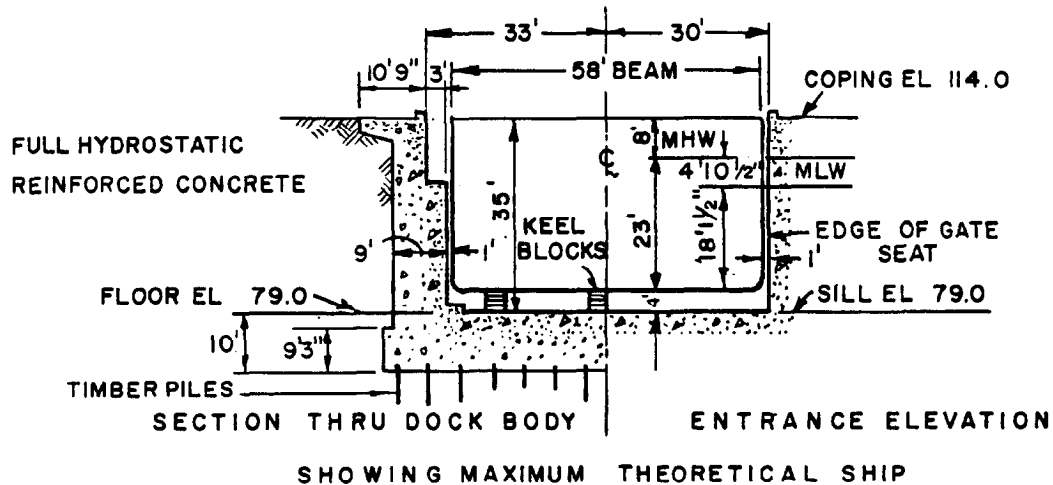
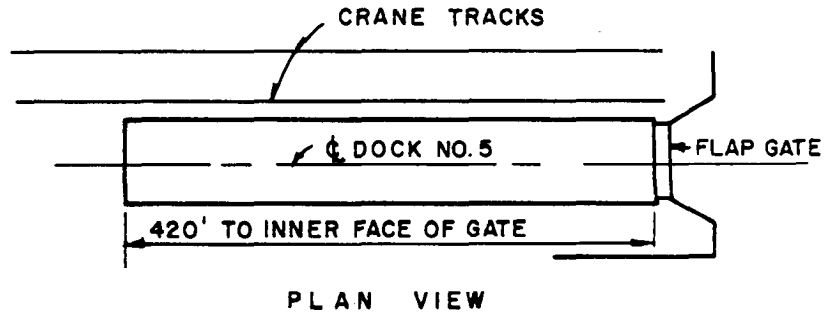
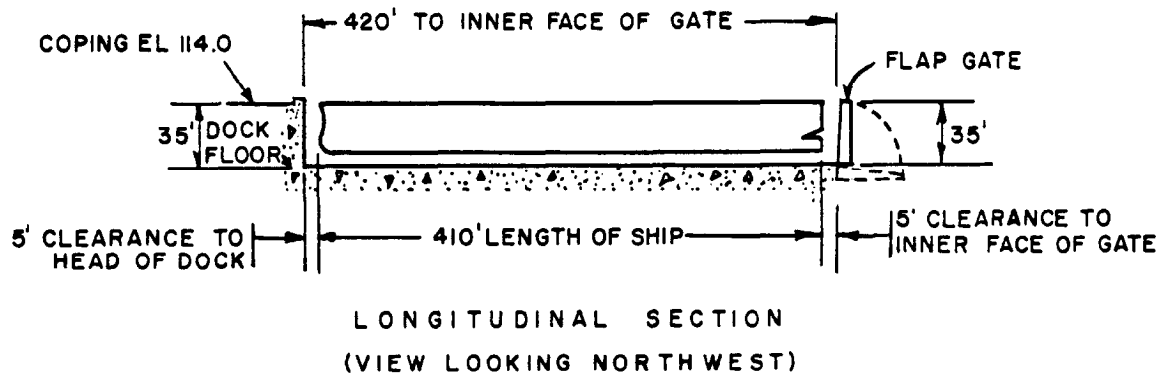


Figure 17
Hunters Point Naval Shipyard Drydock No. 5

Date Completed	Suitable for Docking	Foundation	Construction Material
1944	DD, SS	Piles	Concrete
<div>Closure _____ Flap gate, steel.</div> <div>Dewatering pumps _____ Four 24",200 hp, 60,000 gpm. Time to dewater: 75 min.</div> <div>Drainage pumps _____ One 4", 7.5 hp, 450 gpm.</div> <div>Flooding _____ Through culverts. Time to fled: 45 min.</div> <div>Capstans _____ 2 total: on south side, 30 fpm at 16k.</div>			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main	17 lg tons	105'7"	
Auxiliary	5.4 lg tons	126'2"	
Ship and Industrial Services Furnished at Dock			
Electrical	volt s	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	1,600	1 north side at 1,600 amps.
<div>Fresh water _____ 4' and 6" main, 200 gpm at 40 psi, two 2-1/2" and two 2" outlets north side.</div> <div>Salt water _____ 6" main, 1,500 gpm at 100 psi, three 4" and five 2-1/2 outlets north side. 4" headers at dock floor with outlets.</div> <div>Fire protection _____ Same as saltwater.</div> <div>Low pressure air _____ 4' mains, 4,000 cfm at 100 psi, three 3" outlets north side. 3' headers at dock floor with outlets.</div> <div>High pressure air _____ 1" main, 150 cfm at 3,000 psi, one 1" outlet north side</div> <div>Steam _____ 4' and 6' main, 5,000 phr at 100 psi, three 3" outlets north side.</div> <div>Sanitary sewer _____ 6 mains, 600 gpm, ten 6" inlets each side.</div> <div>Natural gas _____ 3' main, 15 psi, one 2-1/2 outlet north side.</div>			

Figure 17 (continued)
 Hunters Point Naval Shipyard Drydock No. 5

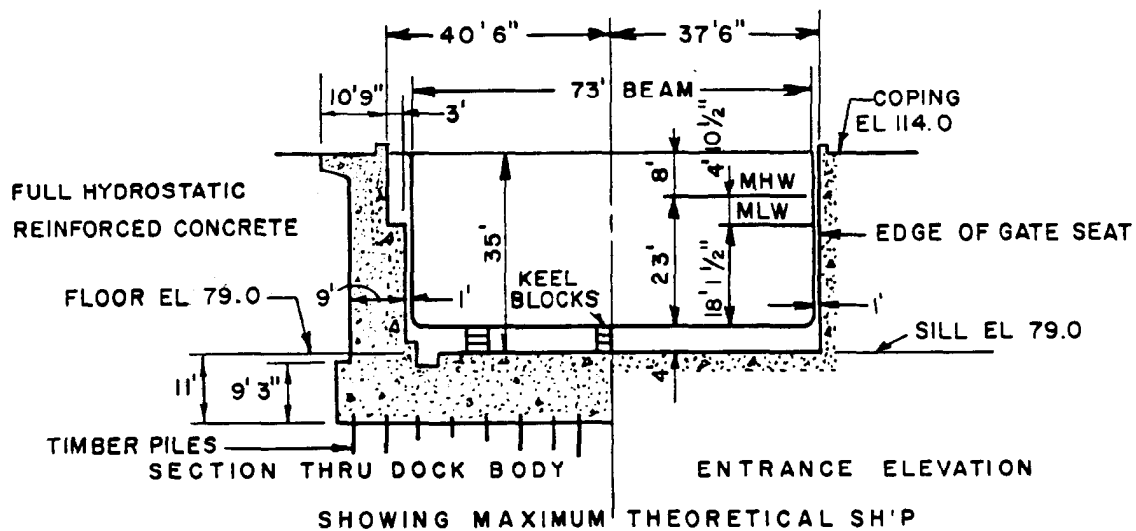
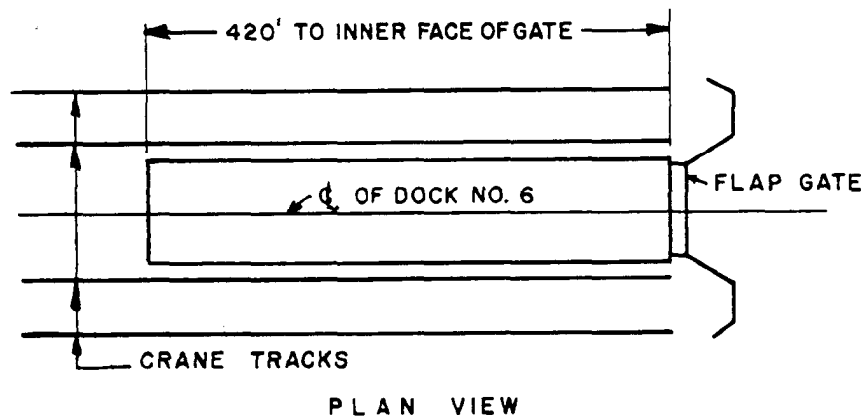
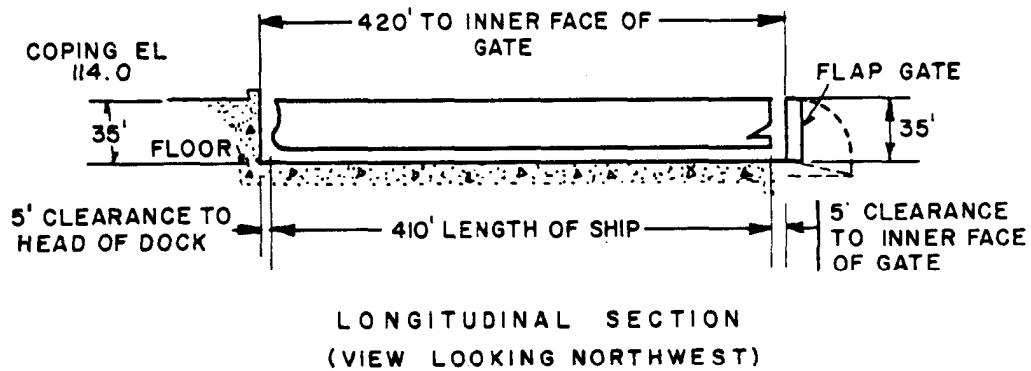


Figure 18
Hunters Point Naval Shipyard Drydock No. 6

Date Completed	Suitable for Docking	Foundation	Construction Material
1944	DD, SS	Piles	Concrete
<div>Closure _____ Flap gate, steel.</div> <div>Dewatering pumps — Four 24",200 hp, 60,000 gpm.</div> <div>Time to dewater 60 min.</div> <div>Drainage pumps _____ One 4',7.5 hp, 450 gpm.</div> <div>Flooding _____ Through culverts. Time to flood: 50 min.</div> <div>Capstans _____ 1 total: at head, 30 fpm at 16k.</div>			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main	12.9 lg tons	100'5	
Auxiliary	5.4 lg tons	121' 7"	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	4 6 0	3,600	1 north side at 400 amps; 1 south side at 1,600 amps; 2 south side at 600 amps.
<div>Fresh water _____ 4" and 6" mains, 200 gpm at 40 psi, two 2-1/2' and two 1-1/2" outlets each side.</div> <div>Salt water _____ 6" mains, 1,500 gpm at 100 psi, three 4' and five 2-1/2' outlets each side. 4' header at dock floor with outlets.</div> <div>Fire protection _____ Same as saltwater.</div> <div>Low pressure air _____ 4" mains, 4,000 cfm at 100 psi, three 3" outlets each side. 3" header at dock floor with outlets.</div> <div>High pressure air _____ 1" mains, 150 cfm at 3,000 psi, one 1" outlet each side.</div> <div>Steam _____ 4" and 6" mains, 5,000 phr at 100 psi, three 3" outlets each side.</div> <div>Sanitary sewer _____ 6" mains, 600 gpm, ten 6" inlets each side.</div> <div>Natural gas _____ 3" mains, 15 psi, one 2-1/2" outlet each side.</div>			

Figure 18 (continued)
 Hunters Point Naval Shipyard Drydock No. 6

Date Completed	Suitable for Docking	Foundation	Construction Material
1944	DD, SS	Piles	Concrete
<p>Closure _____ Flap gate, steel.</p> <p>Dewatering pumps _____ Four 24", 200 hp, 80,000 gpm. Time to dewater: 75 min.</p> <p>Drainage pumps _____ One 4", 7.5 hp, 450 gpm.</p> <p>Flooding _____ Through culverts. Time to flood: 45 min.</p> <p>Capstans _____ 1 total: at head, 30 fpm at 16k.</p>			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main	17 lg tons	105'7"	
Auxiliary	5.4 lg tons	126'2"	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
A c , 3 P h , 6 0 H z	460	2,400	2 each side at 200 amps; 1 south side at 1,600 amps.
<p>Fresh water _____ 4' and 6' main, 200 gpm at 40 psi, two 2-1/2' and two 2' outlets south side.</p> <p>Salt water _____ 6' main, 1,500 gpm at 100 psi, three 4" outlets south side, 4' header at dock floor with outlets.</p> <p>Fire protection _____ Same as saltwater.</p> <p>Low pressure air _____ 4 main, 4,000 cfm at 100 psi, three 3" outlets south side.</p> <p>High pressure air _____ 1" main, 150 cfm at 3,000 psi, one 1" outlet south side.</p> <p>Steam _____ 4' and 6' main, 5)000 phr at 100 psi, three 3' outlets south side.</p> <p>Sanitary sewer _____ 6' mains, 600 gpm, ten 6' inlets each side.</p> <p>Natural gas _____ 3" main, 15 psi, one 2-1/2" outlet south side.</p>			

Figure 19 (continued)
Hunters Point Naval Shipyard Drydock No. 7

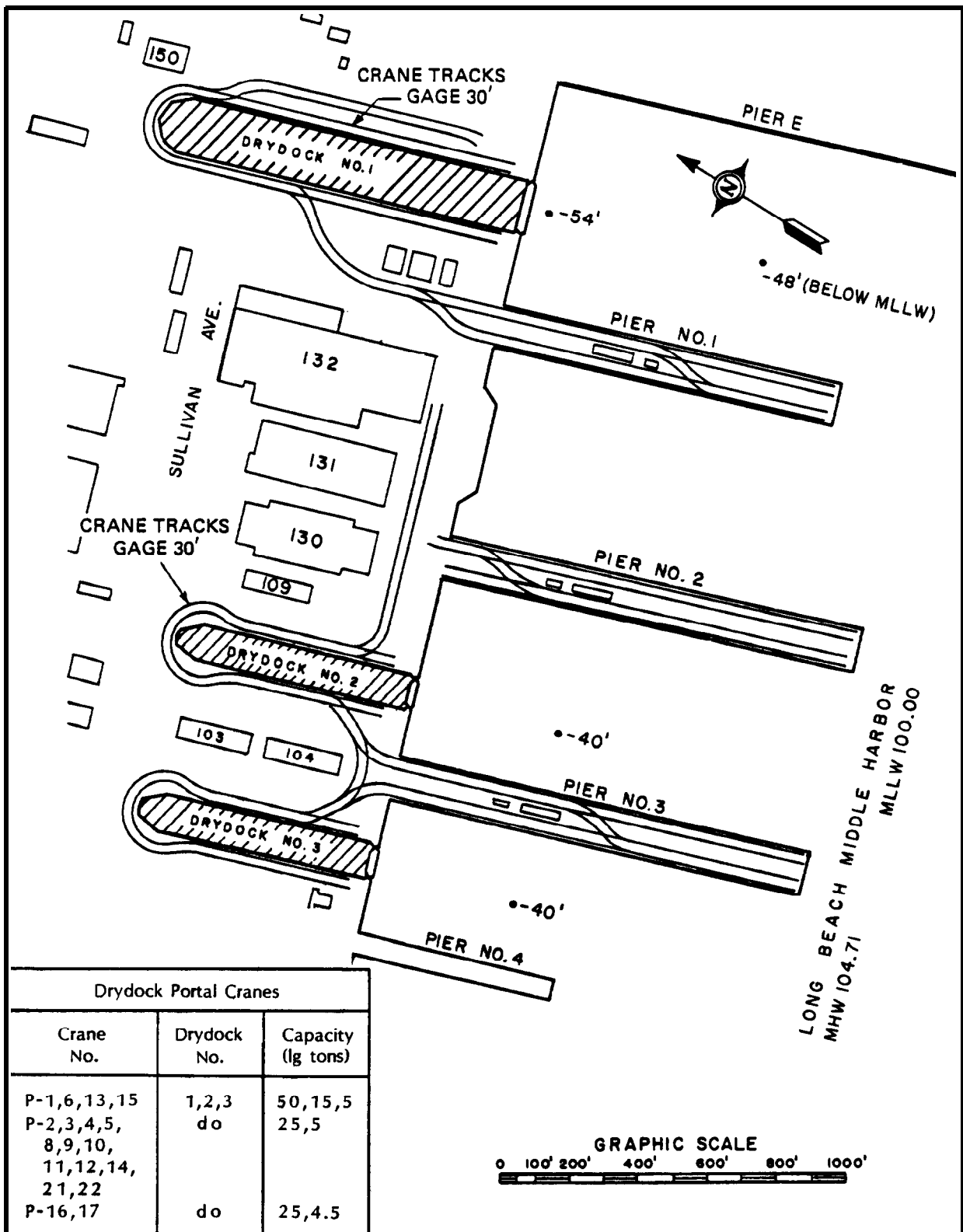


Figure 20
Location of Drydocks, Long Beach Naval Shipyard, Long Beach, California

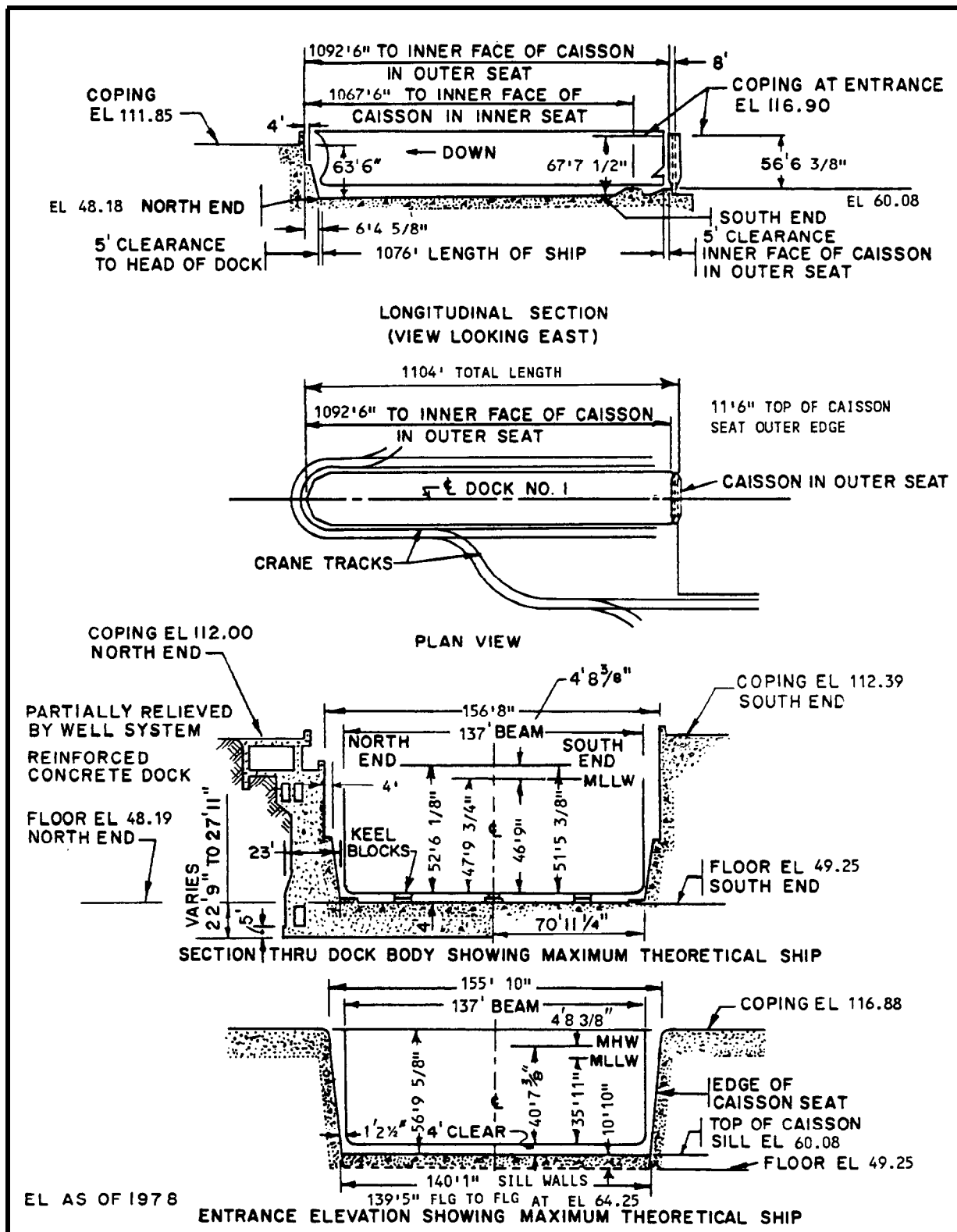


Figure 21
 Long Beach Naval Shipyard Drydock No. 1

Date Completed	Suitable for Docking	Foundation	Construction Material
1942	CV	Earth	Concrete
<div>Closure ————— Caisson, steel (rectangular box type). Spare caisson, reinforced concrete (rectangular box type). Dewatering pumps ————— Sixteen 20",250 hp, 169,000 gpm; sixteen 20", 150 hp,126,000 gpm; six 20",85 hp, 30,000 gpm. Time to dewater 240 min. Drainage pumps ————— Four 20",200 hp, 28,000 gpm. Flooding ————— Through culverts. Time to flood: 135 min. Capstans————— 13 total: 1 at head, 1 each side of entrance, 30 fpm at 30k; 5 each side, 30 fpm at 15k.</div>			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main	50 lg tons	90'0",	
Auxiliary	15 lg tons	126'0'	
Whip	5 lg tons	157'0", 108'0" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	15,600	Three 2,500 amp bus each side; 6 east side and 19 west side at 400 amps; 3 east side and 7 west side at 100 amps.
<div>Fresh water————— 6" mains, 1,000 gpm at 50 psi, two 4" and three 2-1/2" outlets each side. Salt water ————— 8' and 12" mains, 5,000 gpm at 120 psi, two 6' and four 4' outlets each side. Fire protection ————— Same as saltwater. Compressed air ————— 6' mains, 4,000 cfm at 100 psi, two 4" and four 2-1 2/2" outlets each side. 8' headers at dock floor. Steam ————— 6' mains, 36,000 phr at 180 psi, two 3 and four 2' outlets each side. Oxygen ————— 2' mains, 180 cfm at 100 psi, two 1-1/2" outlets each side, three 1" east side, four 1" west side. Acetylene ————— 2" mains, 180cfmat11 psi, one 1 -1/2' outlet east side, two 1-1/2" outlets west side, four 1" outlets each side. Sanitary sewer ————— 8' mains, 1,200 gpm, twenty-six 6 inlets each side. CHT sewer ————— 4" to 12 mains, 1,230 gpm, seven 4' inlets each side. Natural gas ————— 3' mains, 200 cfm at 15 psi, five 1-1/2" outlets east side. six 1-1/2" outlets west side.</div>			

Figure 21 (continued)
Long Beach Naval Shipyard Drydock No. 1

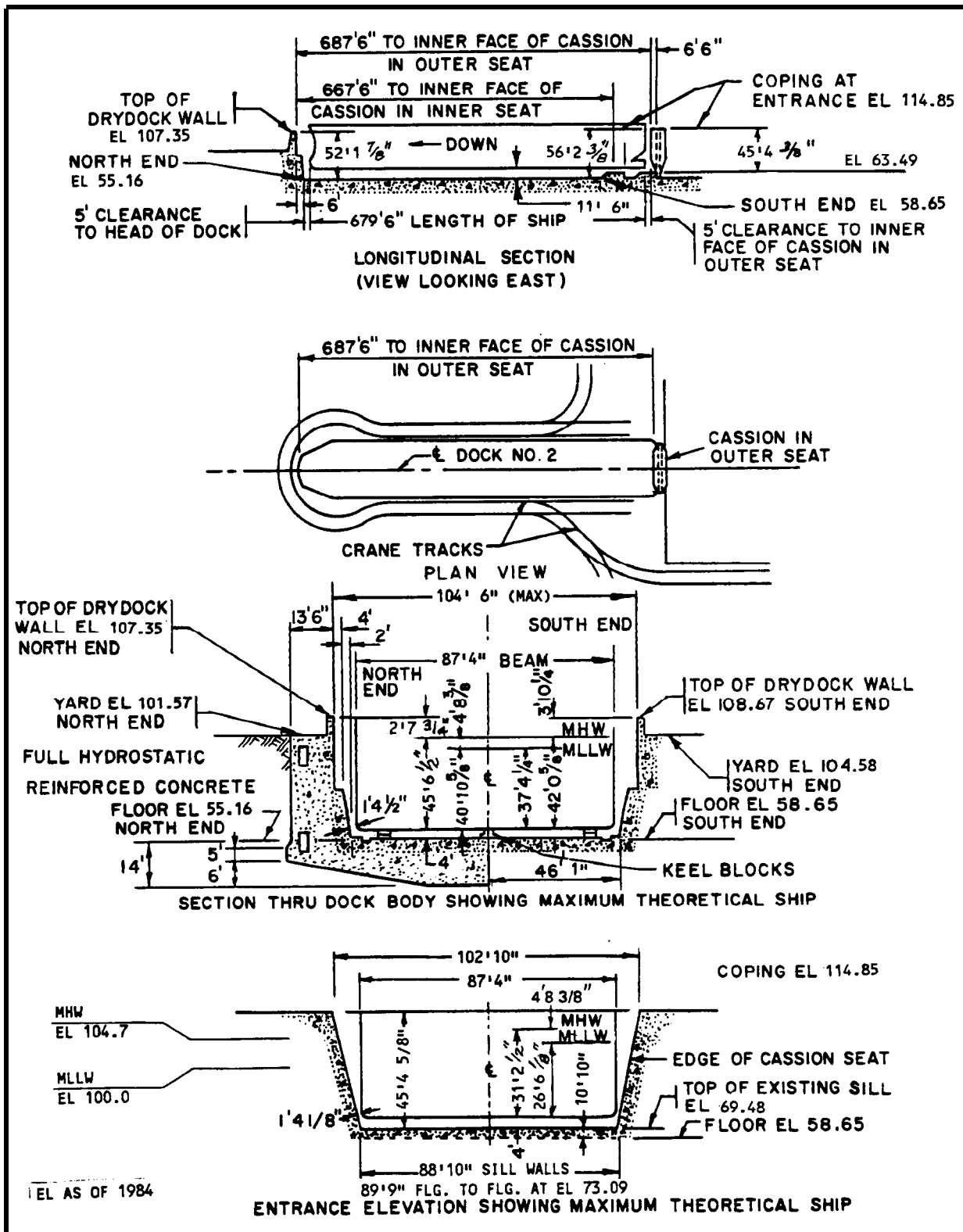


Figure 22
 Long Beach Naval Shipyard Drydock No. 2

Date Completed	Suitable for Docking	Foundation	Construction Material
1943	CG	Earth	Concrete
Closure ————— Caisson, steel (rectangular box type). Spare caisson, reinforced concrete (rectangular box type), also used for Drydock No. 3.			
Dewatering pumps —	Six 36",300 hp, 78,000 gpm; four 30",300 hp, 55,200 gpm. Time to dewater: 135 min.		
Drainage pumps —————	One 12",75 hp, 3,000 gpm.		
Flooding —————	Through culverts. Time to flood: 90 min.		
Capstans —————	7 total: 1 at head, 1 each side of entrance, 30 fpm at 30k; 2 each side, 30 fpm at 15k.		
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main	50 lg tons	106'0'	
Auxiliary	15 lg tons	133'6'	
Whip	5 lg tons	157' 0", 108'0" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	5,400	1500 amp bus each side; 6 each side at 400 amps; 1 west side of entrance at 200 amps.
Fresh water ————— 8' mains, 1,000 gpm at 50 psi, six 2-1/2" outlets each side.			
Salt water ————— 8' mains, 1,200 gpm at 120 psi, four 2-1/2" outlets each side.			
Fire protection ————— Same as salt water.			
Compressed air ————— 6' mains, 5,000 cfm at 100 psi, four 2-1/2' outlets each side. 4" headers at dock floor with outlets.			
Steam ————— 6" mains, 18,000 phr at 180 psi, four 2-1/2' outlets each side.			
Oxygen ————— 1-1/2' mains, 300 cfm at 100 psi, four 1" outlets each side.			
Acetylene ————— 1-1/2' mains, 140 cfm at 11 psi, four 1" outlets each side.			
Sanitary sewer ————— 8" mains, 550 gpm, thirty 6" inlets each side.			
CHT sewer ————— 4' and 6' mains, 1,040 gpm, four 4" inlets each side.			
Natural gas ————— 2-1/2" mains, 150 cfm at 15 psi, four 1 -1/2" outlets each side.			

Figure 22 (continued)
Long Beach Naval Shipyard Drydock No. 2

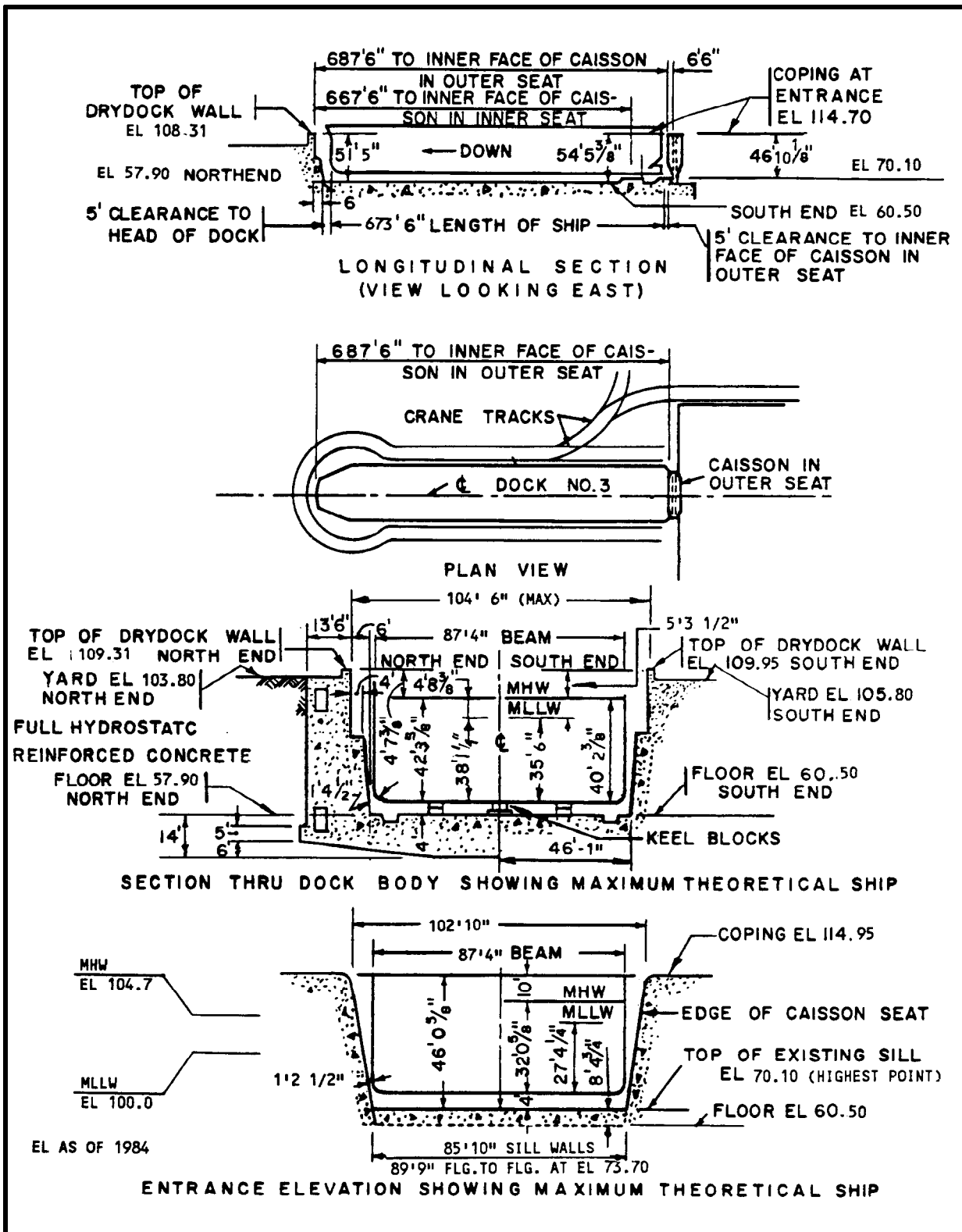


Figure 23
 Long Beach Naval Shipyard Drydock No. 3

Date Completed	Suitable for Docking	Foundation	Construction Material
1943	CG	E a r t h	Concrete
Closure	Caisson, steel (rectangular box type). Spare caisson, reinforced concrete (rectangular box type), also used for Drydock No. 2.		
Dewatering pumps	Six 36",300 hp, 78,000 gpm; four 30",300 hp, 55,200 gpm. Time to dewater: 135 min.		
Drainage pumps	One 12“, 75 hp, 3,000 gpm.		
Flooding	Through culverts. Time to flood: 90 min.		
Capstans	7 total: 1 at head, 1 each side of entrance, 30 fpm at 30k; 2 each side, 30 fpm at 15k.		
Portal Crane Maximum Capacities and Heights			
Hook		Max height above coping with hook at dock centerline	
Main	50 lg tons	106’ 0"	
Auxiliary	15 lg tons	133’6"	
Whip	5 lg tons	157’ 0“, 108’ 0" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	5,400	1500 amp bus each side; 7 each side at 400 amps; 1 east side of entrance at 200 amps.
Fresh water	6" mains, 1,000 gpm at 50 psi, six 2-1/2’ outlets each side.		
Salt water	8" mains, 1,200 gpm at 120 psi, four 2-1/2’ outlets each side.		
Fire protection	Same as saltwater.		
Compressed air	6" mains, 5,000 cfm at 100 psi, four 2-1/2” outlets each side. 4" headers at dock floor with outlets.		
Steam	6" mains, 18,000 phr at 180 psi, four 2-1/2” outlets each side.		
Oxygen	1-1/2” mains, 300 cfm at 100 psi, four 1” outlets each side.		
Acetylene	1-1/2" mains, 140 cfm at 11 psi, four 1” outlets each side.		
Sanitary sewer	8’ mains, 550 gpm, thirty 6’ inlets each side.		
CHT sewer	4" and 6’ mains, 1,040 gpm, four 4’ inlets each side.		
Natural gas	2-1/2" mains, 150 cfm at 15 psi, four 1-1/2” outlets each side.		

Figure 23 (continued)
Long Beach Naval Shipyard Drydock No. 3

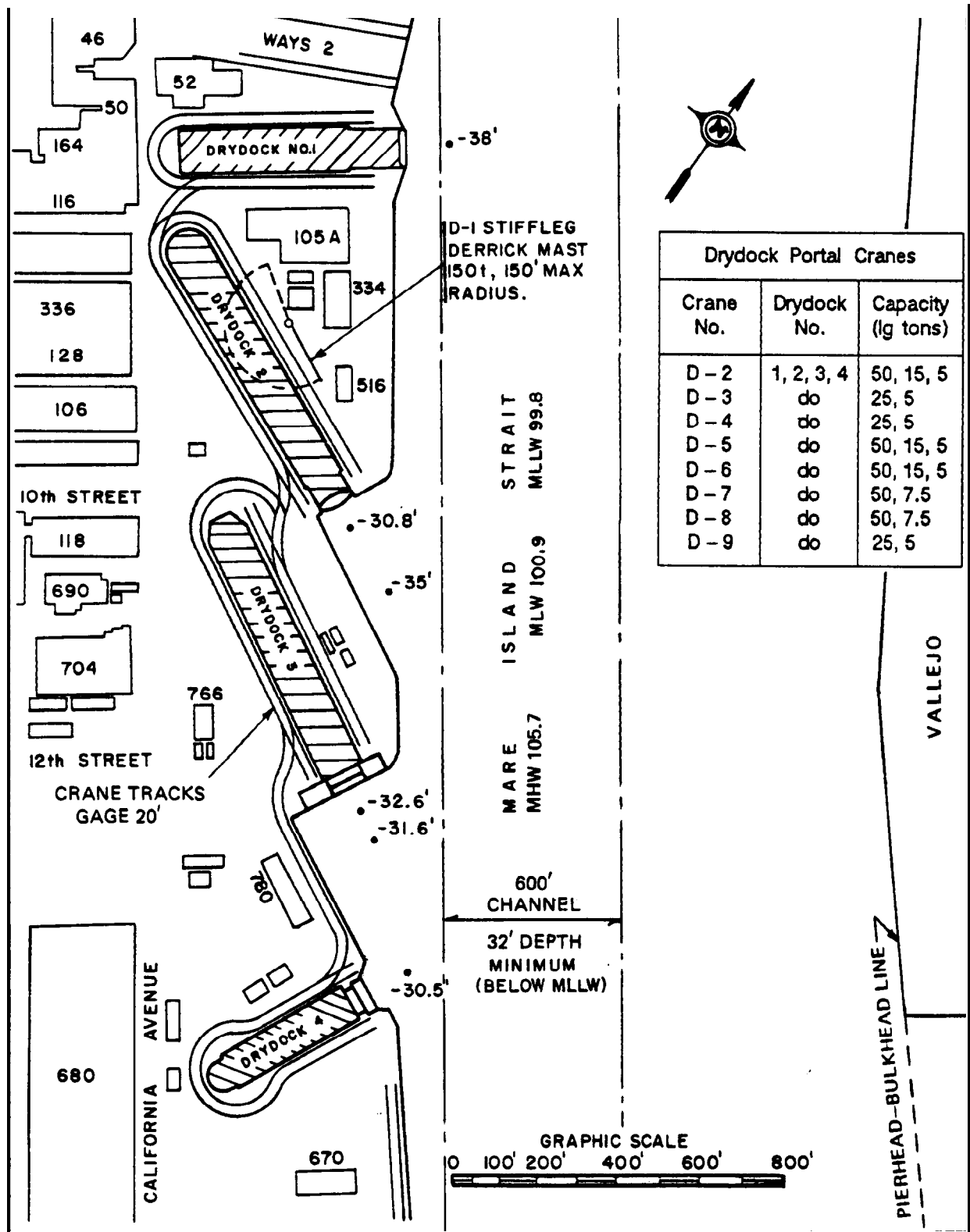


Figure 24
Location of Drydocks, Mare Island Naval Shipyard, Vallejo California

525'0" TO INNER FACE OF CAISSON IN OUTER SEAT

CAISSON IN OUTER SEAT

CRANE TRACKS

DRYDOCK NO. 1

PLAN VIEW

PLAIN CONCRETE WITH GRANITE FACING

PARTIALLY (FLOOR) RELIEVED

26'11" HEAD END

28'2" CAISSON END

FLOOR EL 75.3 AT HEAD END
EL 74.1 AT CAISSON END

SECTION THRU DOCK BODY

ENTRANCE ELEVATION

4'

61'0"

46'6"

SUPERFLOOD EL 109.0

3'3"

MHW 4'10"

MLW

68 BEAM

30'11"

R=8'

SILL EL 70.0

KEEL BLOCKS

18'

4'

15'

28'

30'8"

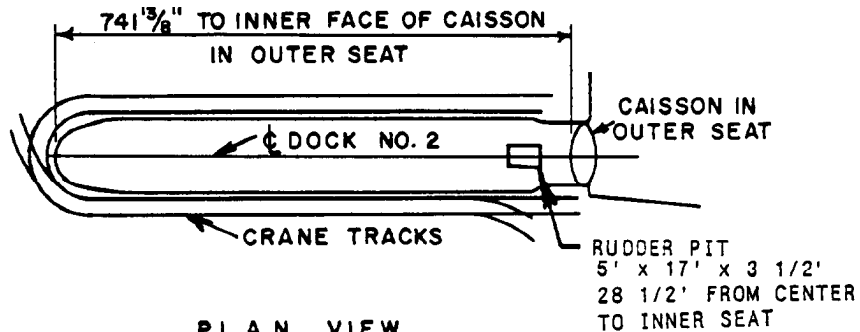
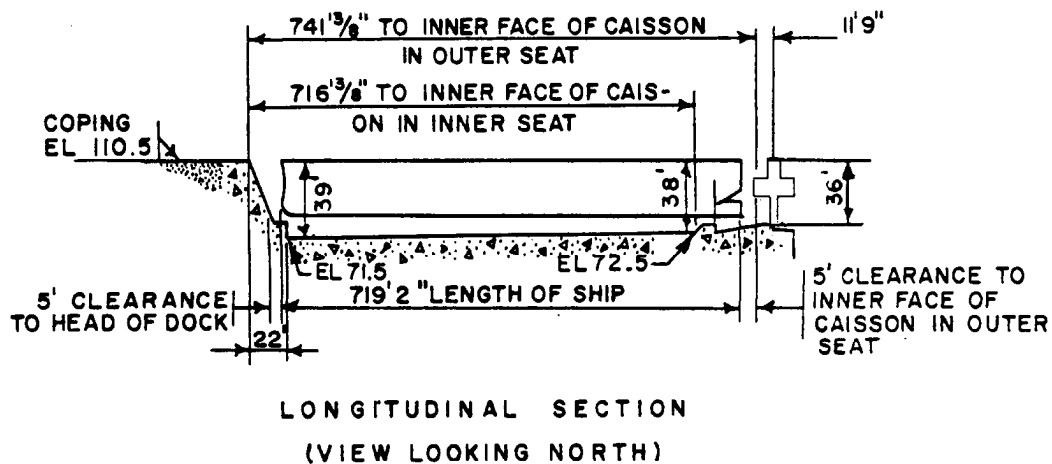
8'

COPING EL 110.5

Figure 25
Mare Island Naval Shipyard Drydock No. 1

Date Completed	Suitable for Docking	Foundation	Construction Material
1891	SSBN	Earth	Concrete and granite
Closure _____ Caisson, steel (rectangular box type). Dewatering pumps_____ Two 54", 550 hp, 198,400 gpm. Pumps also used for Drydock No. 2. Time to dewater: 75 min. Drainage pumps _____ Two 6", 50 hp, 3,000 gpm, two 12", 60 hp, 5,000 gpm. Pumps also used for Drydock No. 2. Flooding _____ Through caisson, Time to flood: 90 min. Superflooding pumps: two 42", 150 hp, 72,000 gpm. Capstans _____ 4 total: 1 at head, 1 south side, 30 fpm at 20k; 1 each side of entrance, 30 fpm at 10k.			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main Auxiliary Whip	50 lg tons 15 lg tons 5 lg tons	112' 6" 135' 5" 123' 8", 115' 6" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz Ac, 3 Ph, 60 Hz Ac, 3 Ph, 60 Hz	450 480 480	4,200 1,000 1,200	2 south side at 3,000 amps. South side: 3 at 800 amps, 6 at 200 amps, and 24 at 100 amps. North side: 6 at 200 amps, 24 at 100 amps, and 3 at 600 amps.
Fresh water _____ 6" mains, 1,600 gpm at 60 psi; eleven 2 1/2", four 1 1/2" south side; five 2 1/2", three 1 1/2" north side. Pure water _____ 2" mains, 50 gpm at 60 psi, one 2 outlet north side. Salt water _____ 4" mains, 1,200 gpm at 100 psi, twelve 2-1/2" and four 1-1/2" outlets north side, twelve 2-1 /2' outlets, five 1-1/2' south side. Fire protection _____ Same as salt water. Low pressure air _ 4" and 6' mains, 5,000 cfm at 90 psi, nine 2-1/2' and twenty-five 1-1/4" outlets north side, eight 2-1/2' and twenty 1-1 /4" outlets south side. High pressure air _ 1-1/2" main, 0.75 cfm at 5,000 psi, one 1/2" outlet north side. Steam _____ 3" mains: north side, 10,000 phr, south side, 3,500 phr at 150 psi. One 1-1/4" outlet north side, one 1-1/2" outlet one 3" outlet south side. Sanitary sewer _____ 4" and 8" mains, 1,200 gpm, four 4" inlets each side.			

Figure 25 (continued)
Mare Island Naval Shipyard Drydock No. 1



FULL HYDROSTATIC
REINFORCED CONCRETE

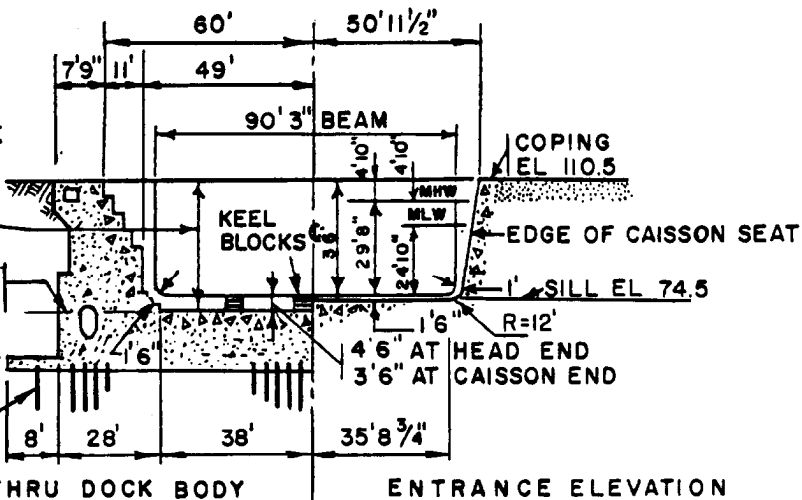
39' HEAD END
38' CAISSON END

FLOOR EL 71.5 HEAD END
EL 72.5 CAISSON END

EL 63.25

TIMBER PILES

SECTION THRU DOCK BODY



SHOWING MAXIMUM THEORETICAL SHIP

Figure 26
Mare Island Naval Shipyard Drydock No. 2

Date Completed	Suitable for Docking	Foundation	Construction Material
1910	CGN, SSBN	Piles	Concrete
Closure _____ Caisson, steel Rect. box with narrow keel. Dewatering pumps_____ Two 54", 550 hp, 198,400 gpm. Pumps also used for Drydock No. 1. Time to dewater: 140 min. Drainage pumps_____ Two 6", 50 hp, 3,000 gpm; two 12", 80 hp, 5,000 gpm. Pumps also used for Drydock No. 1. Flooding _____ Through caisson. Time to flood: 75 min. Capstans _____ 7 total: 1 at head, 1 each side of entrance, 30 fpm at 20k; 2 each side, 34 fpm at 11 k.			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main Auxiliary whip	50 lg tons 15 lg tons 5 lg tons	113' 10' 351' 5" 123' 8", 115' 6" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 80 Hz Ac, 3 Ph, 60 Hz	450 480	4,200 1,200	2 north side at 3000 amps. 3 north side at 800 amps; South side: 3 at 400 amps, 12 at 200 amps, 48 at 100 amps.
Ac, 3 Ph, 80 Hz	480	1,800	North side: 3 at 800 amps, 12 at 200 amps, 48 at 100 amps
Fresh water _____ 4" mains, 750 gpm at 80 psi, five 2-1/2" outlets each side. Salt water _____ 6" and 8" mains, 1,500 gpm at 100 psi, ten 3' north, twenty-three 2-1/2" south. Fire protection _____ Same as salt water. Compressed air _____ 4" mains, 4,000 cfm at 90 psi, sixteen 1-1/4" each side. Steam _____ 3" and 4" mains, 10,000 phr at 150 psi, six 2' outlets. Sanitary sewer _____ 8" mains, 1,050 gpm, five 4" inlets each side.			

Figure 26 (continued)
Mare Island Naval Shipyard Drydock No. 2

Date Completed	Suitable for Docking	Foundation	Construction Material
1940	CGN, SSBN	Piles	Concrete
<p>Closure _____ Caisson, steel (rectangular box type).</p> <p>Dewatering pumps _____ Two 54", 800 hp, 200,000 gpm. Pumps also used for Drydock No. 4. Time to dewater 180 min.</p> <p>Drainage pumps _____ Two 12", 225 hp, 11,000 gpm. Pumps also used for Drydock No. 4.</p> <p>Flooding _____ Through culverts. Time to flood: 85 min.</p> <p>Capstans _____ 7 total: 1 at head, 30 fpm at 25k; 1 each side of entrance, 30 fpm at 24k; 2 each side, 30 fpm at 12k.</p>			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main	50 lg tons	113' 10"	
Auxiliary	15 lg tons	135' 5"	
Whip	5 lg tons	123' 8", 115' 6" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	450	4,200	2 north side at 3,000 amps.
Ac, 3 Ph, 80 Hz	480	1,000	North side: 3 at 400 amps, 48 at 100 amps.
Ac, 3 Ph, 60 Hz	480	1,000	3 south side at 400 amps.
<p>Fresh water _____ 8 mains, 1,000 gpm at 80 psi, eight 2" and eight 1-1/2" outlets each side, one 3/4 outlet south side.</p> <p>Salt water _____ 6" and 8" mains, 1,800 gpm at 100 psi, eight 2-1/2" and one 1-1/2 outlets each side. 4' header at dock floor with outlets.</p> <p>Fire protection _____ Same as salt water.</p> <p>Compressed air _____ 6' mains, 3,300 cfm at 90 psi, eight 2-1/2', nine 1-1/2" and eight 3/4" outlets each side. 4' header at dock floor with outlets.</p> <p>Steam _____ 4" mains, 8,000 phr at 150 psi, four 2", four 1-1/2", three 1" and four 3/4" outlets each side.</p> <p>Sanitary sewer _____ 8" mains, 1,000 gpm, five 4" inlets each side.</p>			

Figure 27 (continued)
Mare Island Naval Shipyard Drydock No. 3

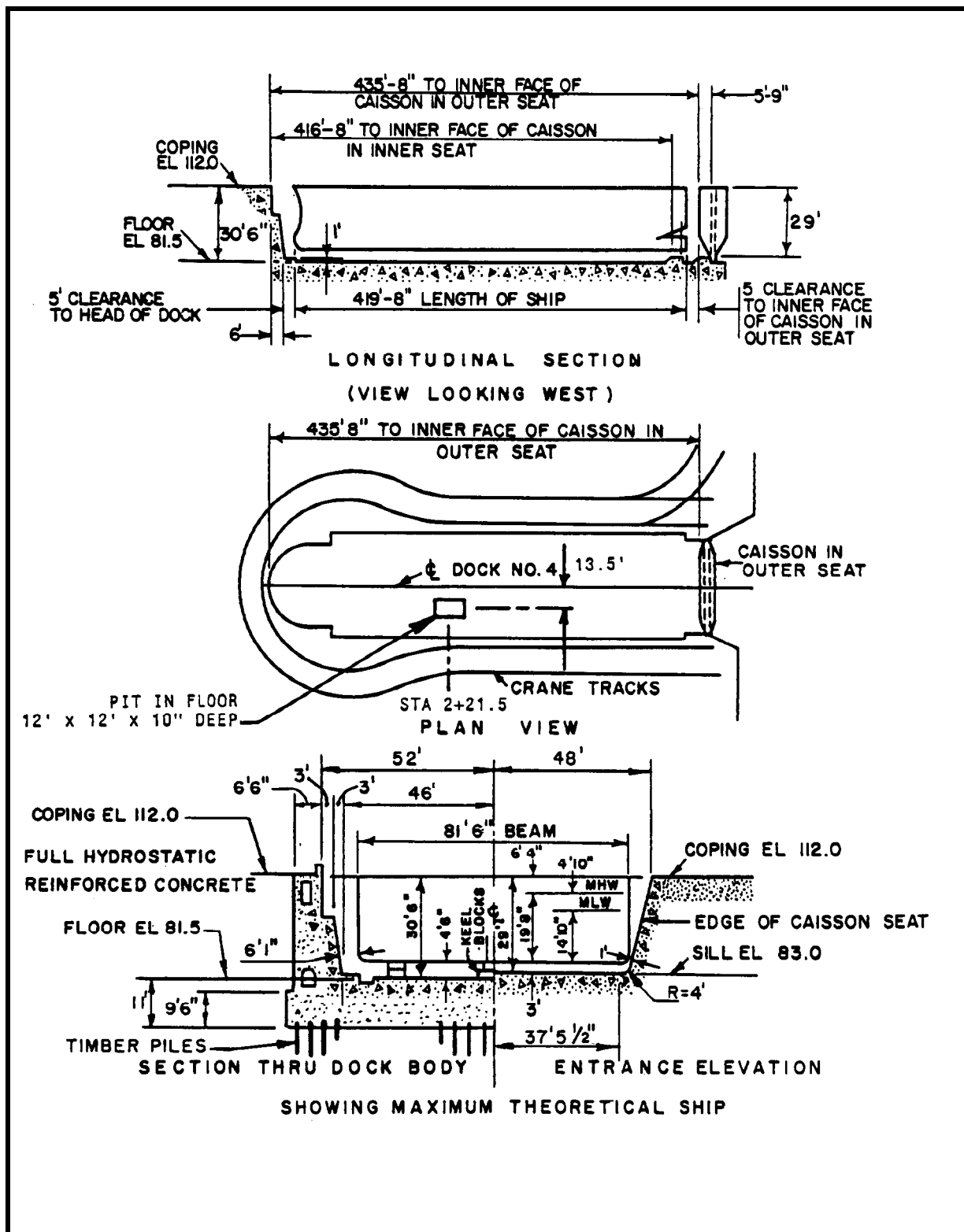


Figure 28
Mare Island Naval Shipyard Drydock No. 4

Date Completed	Suitable for Docking	Foundation	Construction Material
1942	DD, SSN	Piles	Concrete
<p>Closure _____ Caisson, steel (rectangular box type). Dewatering pumps_____Two 54", 800 hp, 200,000 gpm. (Drydock No. 3 pumphouse). Time to dewater: 75 min. Drainage pumps_____Two 12", 225 hp, 11,000 gpm. (Drydock No. 3 pumphouse). Flooding _____ Through culverts. Time to flood: 45 min. Capstans _____ 5 total: 1 at head, 30 fpm at 24k; 1 each side of entrance, 1 each side, 30 fpm at 12k.</p>			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main Auxiliary Whip	50 lg tons 15 lg tons 5 lg tons	117' 8" 135' 5" 123' 8", 115' 6" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz ACJ 3 Ph, 60 Hz Ac, 3 Ph, 60 Hz	450 480 480	4,200 1,000 800	2 south side at 3,000 amps. North. South: 3 each side at 400 amps; 6 each side at 200 amps; 24 each at 100 amps.
Fresh water _____	6" mains, 1,000 gpm at 60 psi, twelve 2-1/2' outlets on south side and four 2-1/2' outlets north side, four 1-1/2' outlets each side.		
Salt water _____	8" mains, 1,800 gpm at 100 psi, six 2-1/2" outlets each side, six 1-1/2" outlets each side, one 4" outlet each side.		
Fire protection _____	Same as salt water.		
Compressed air _____	4" mains, 3,000 cfm at 90 psi, ten 2-1/2", one 1-1/2" and eleven 1-1/4" outlets north side, twelve 2-1/2", four 1-1/2" and fourteen 1-1/4" outlets south side.		
Steam _____	3' mains, 10,000 phr at 150 psi, one 2" and five 1-1/2" outlets north side, six 1-1/2" outlets south side.		
Sanitary sewer _____	8' mains, 880 gpm, four 4" inlets each side.		

Figure 28 (continued)
Mare Island Naval Shipyard Drydock No. 4

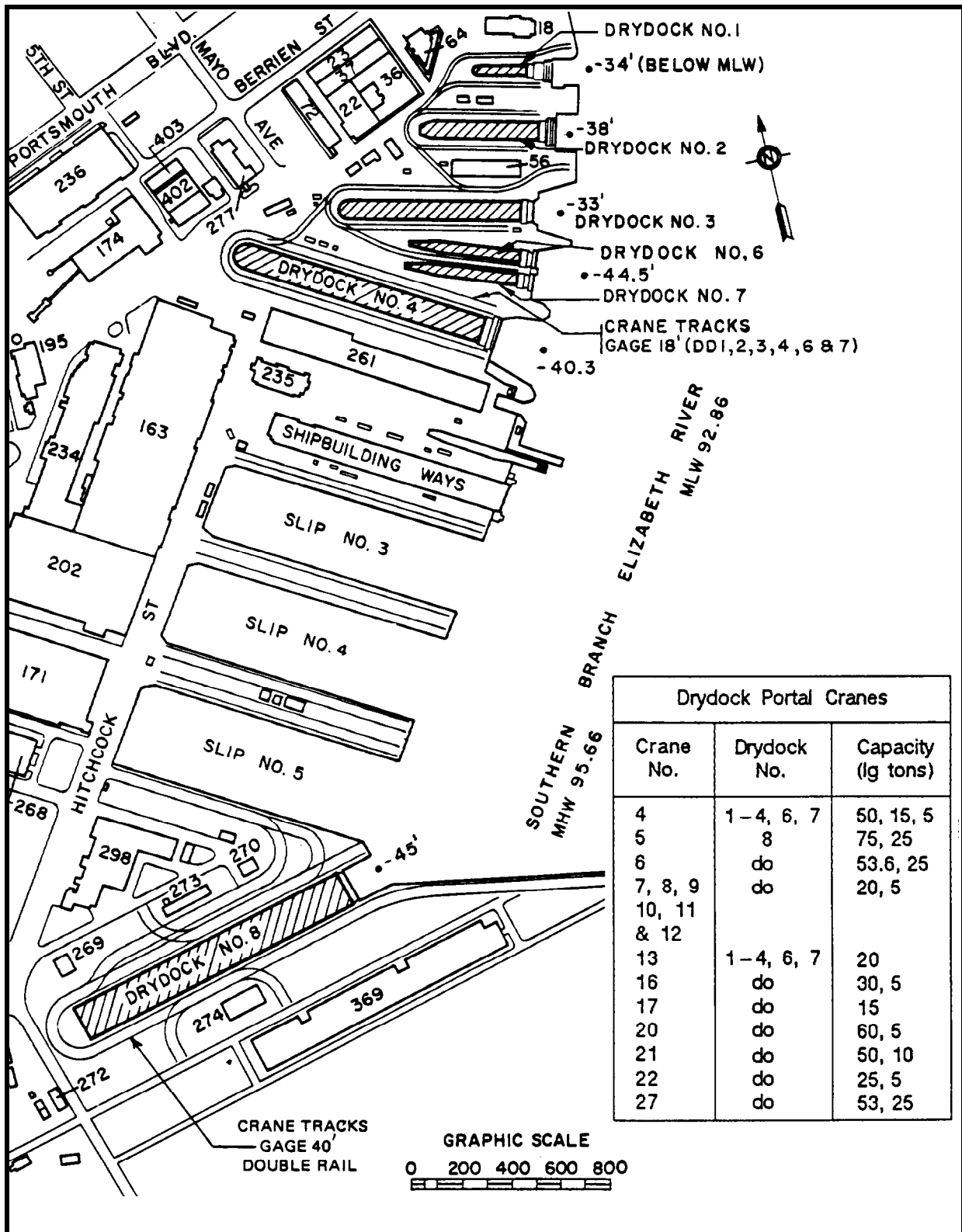


Figure 29
Location of Drydocks, Norfolk Naval Shipyard, Portsmouth, Virginia

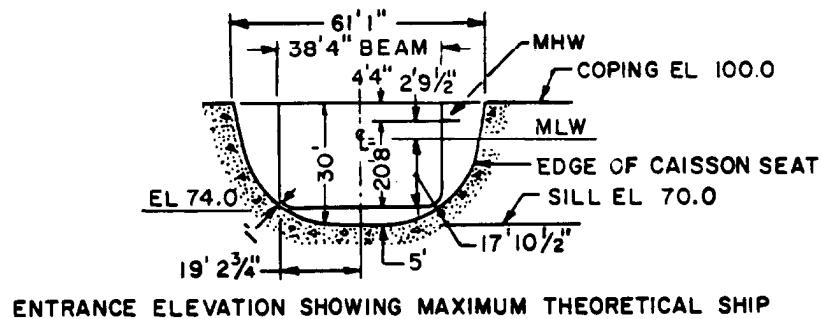
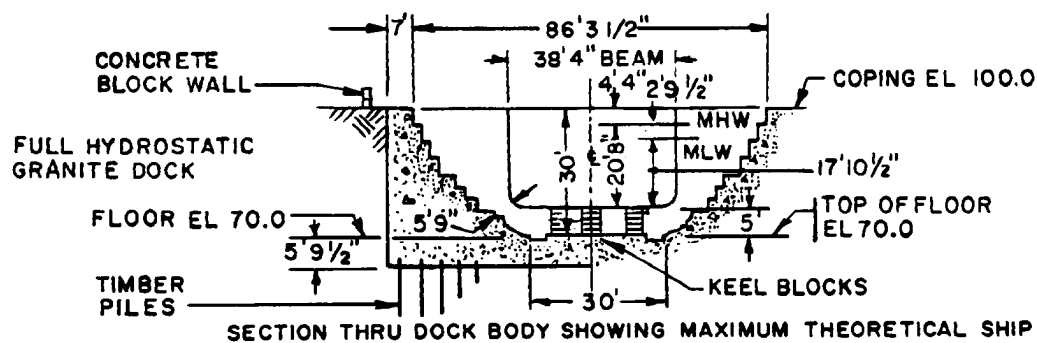
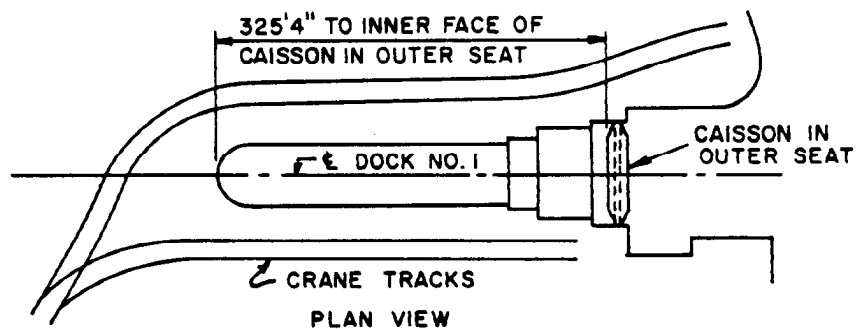
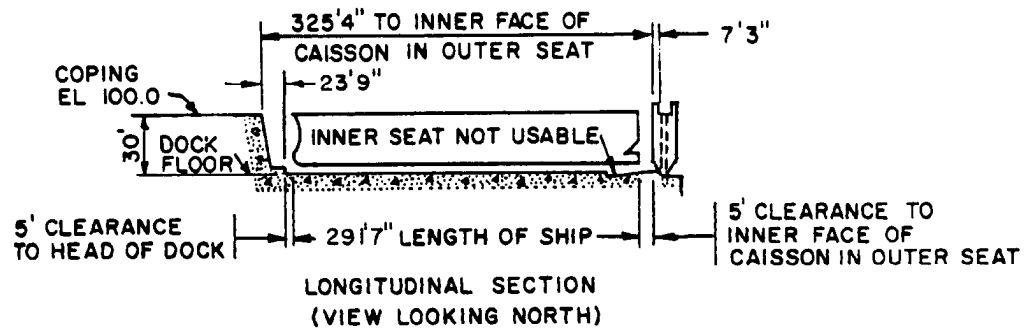


Figure 30
Norfolk Naval Shipyard Drydock No. 1

Date Completed	Suitable for Docking	Foundation	Construction Material
1833	Service Craft	Piles	Granite
Item	Data		
Closure _____ Caisson, steel (rectangular box type). Dewatering pumps_____ One 42", 800 hp, 45,000 gpm; one 42", 600 hp, 50,000 gpm; one 42", 800 hp, 96,000 gpm (Drydock No. 2 pumphouse). Time to dewater: 60 min. Drainage pumps_____ Two 12“, 125 hp, 9,000 gpm (Drydock No. 2 pumphouse). Flooding _____ Through caisson. Time to flood: 45 min. Capstans _____ 4 total: 1 at head, 30 fpm at 30k; 1 each side of entrance, 1 south side at head, 30 fpm at 12k.			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main Whip	60 lg tons 5 lg tons	100' 7“ 151' 7“, 84' 0" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz____	460	1,200	3 south side at 400 amps.
Item	Data		
Fresh water _____ 6" mains, 300 gpm at 50 psi, one 2-1/2” outlet each side. Salt water _____ 6" north side main, 850 gpm at 150 psi, three 2-1/2” outlets and one 4“ outlet north. Fire protection _____ Same as salt water. Compressed air_____ 4" main, 1,600 cfm at 100 psi, sixteen 2’ outlets south side. Steam _____ 4" main, 8,000 phr at 100 psi, nine 2" outlets south. Sanitary sewer _____ None			

Figure 30 (continued)
Norfolk Naval Shipyard Drydock No. 1

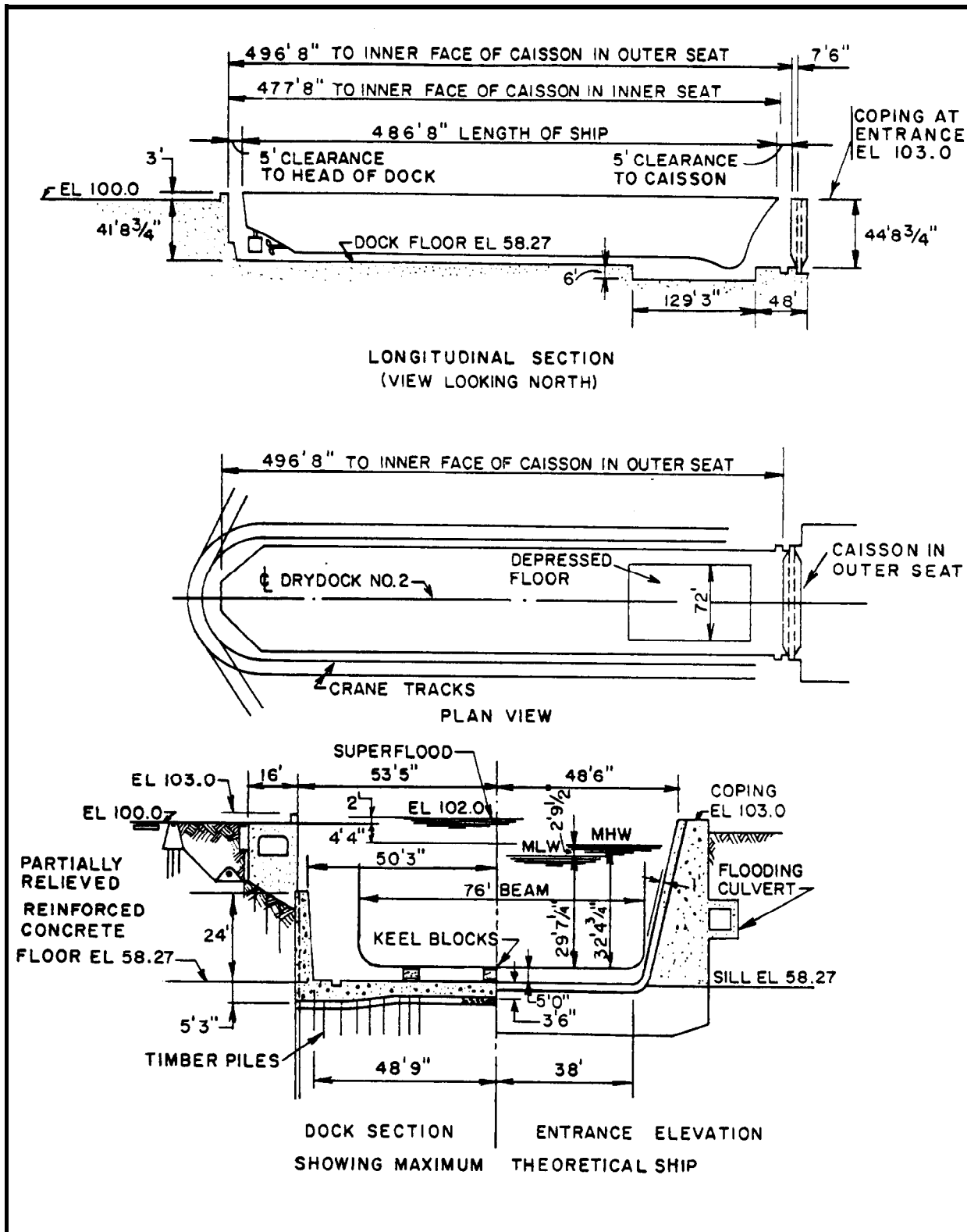


Figure 31
Norfolk Naval Shipyard Drydock No. 2

Date Completed	Suitable for Docking	Foundation	Construction Material
1966	DD, SSBN	Piles	Concrete
Item	Data		
Closure _____	Caisson, steel (rectangular box type).		
Dewatering pumps_____	One 42", 600 hp, 45,000 gpm; one 42", 600 hp, 50,000 gpm; one 42", 600 hp, 96,000 gpm. Pumps also used for Drydocks No. 1 and 3.		
	Time to dewater: 135 min.		
Drainage pumps_____	Two 12", 125 hp, 9,000 gpm (also used for Drydocks No. 1 and 3); two 4", 46.9 hp, 1,800 gpm.		
Flooding_____	Through culvert. Time to flood: 75 min. Dewatering Pump No. 2 used to superflood.		
Capstans_____	4 total: 1 each side of entrance, 1 south side, 30 fpm at 30k; 1 north side (Drydock No. 1 capstan), 30 fpm at 12k.		
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main	50 lg tons	103' 5"	
Auxiliary	10 lg tons	141' 3"	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	11,500	600	1 south side from pad at portable substation can be used for DD.
Ac, 3 Ph, 60 Hz	460	5,600	1 north side at 500 amps. 16 north side and 35 south side at 400 amps.
Item	Data		
Fresh water_____	6" mains, 1,650 gpm at 50 psi, five 2-1/2" outlets and one 4" outlet each side.		
Salt water _____	12" mains, 3,650 gpm at 150 psi, six 2-1/2" outlets and two 4" outlets north side, nine 2-1/2" outlets and six 4" outlets south side.		
Fire protection_____	Same as salt water.		
Compressed air_____	6" mains, 12,200 cfm at 100 psi, fifteen 2" outlets north side, twenty 2" outlets south side. Three 4' and seven 2" outlets in bottom dock each side.		
Steam _____	6" mains, 12,000 phr at 100 psi, ten 2" outlets north side, six 2" outlets south side.		
Sanitary sewer_____	8" mains, eight 4" inlets north side, six 4" inlets south side.		

Figure 31 (continued)
Norfolk Naval Shipyard Drydock No. 2

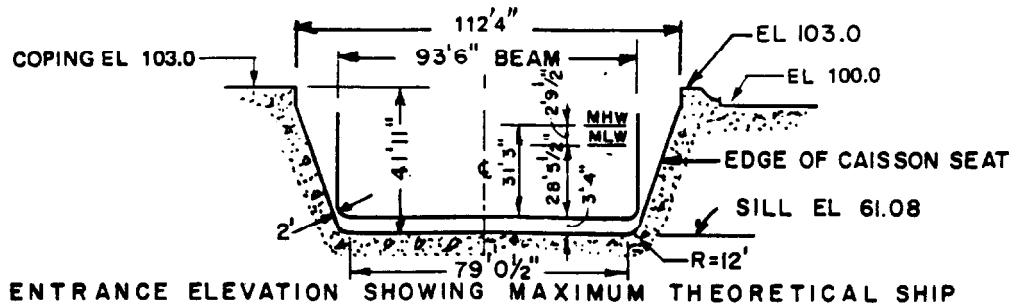
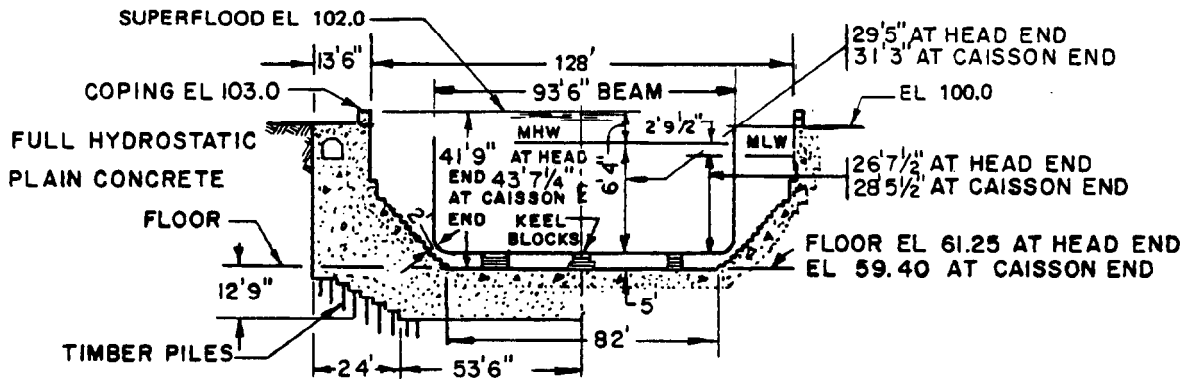
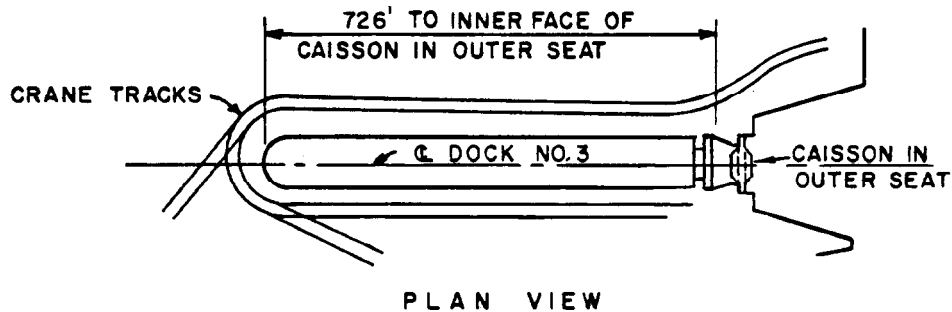
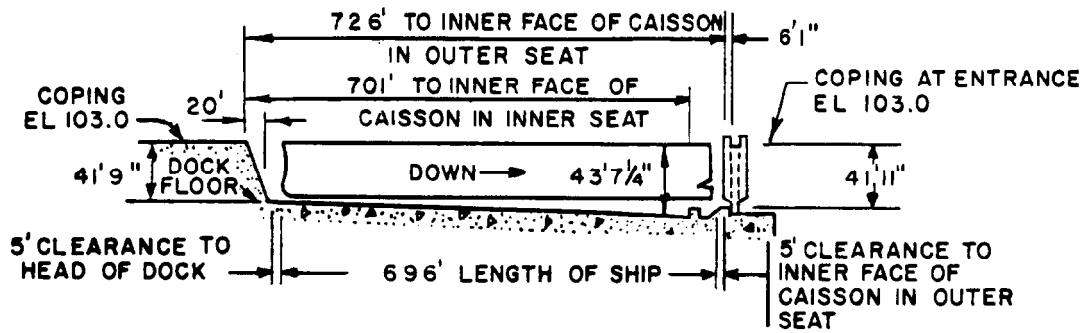


Figure 32
Norfolk Naval Shipyard Drydock No. 3

Date Completed	Suitable for Docking	Foundation	Construction Material														
1911	CGN, SSBN	Piles	Concrete and granite														
<table><tr><th>Item</th><th>Data</th></tr><tr><td>Closure _____</td><td>Caisson, steel (rectangular box type).</td></tr><tr><td>Dewatering pumps _____</td><td>One 42", 600 hp, 45,000 gpm; one 42", 600 hp, 50,000 gpm; one 42", 800 hp, 96,000 gpm. Pumps also used for Drydock No. 2 pumphouse). Time to dewater: 135 min.</td></tr><tr><td>Drainage pumps _____</td><td>Two 12", 125 hp, 9,000 gpm (Drydock No. 2 pumphouse).</td></tr><tr><td>Flooding _____</td><td>Through caisson. Time to flood: 90 min.</td></tr><tr><td>Capstans _____</td><td>Dewatering Pump No. 2 (Drydock No. 2 pumphouse) used to superflood. 11 total: 1 at head, 30 fpm at 30k; 2 each side of entrance, 4 north side, 1 south side, 30 fpm at 30; 1 south side, 30 fpm at 30k.</td></tr></table>				Item	Data	Closure _____	Caisson, steel (rectangular box type).	Dewatering pumps _____	One 42", 600 hp, 45,000 gpm; one 42", 600 hp, 50,000 gpm; one 42", 800 hp, 96,000 gpm. Pumps also used for Drydock No. 2 pumphouse). Time to dewater: 135 min.	Drainage pumps _____	Two 12", 125 hp, 9,000 gpm (Drydock No. 2 pumphouse).	Flooding _____	Through caisson. Time to flood: 90 min.	Capstans _____	Dewatering Pump No. 2 (Drydock No. 2 pumphouse) used to superflood. 11 total: 1 at head, 30 fpm at 30k; 2 each side of entrance, 4 north side, 1 south side, 30 fpm at 30; 1 south side, 30 fpm at 30k.		
Item	Data																
Closure _____	Caisson, steel (rectangular box type).																
Dewatering pumps _____	One 42", 600 hp, 45,000 gpm; one 42", 600 hp, 50,000 gpm; one 42", 800 hp, 96,000 gpm. Pumps also used for Drydock No. 2 pumphouse). Time to dewater: 135 min.																
Drainage pumps _____	Two 12", 125 hp, 9,000 gpm (Drydock No. 2 pumphouse).																
Flooding _____	Through caisson. Time to flood: 90 min.																
Capstans _____	Dewatering Pump No. 2 (Drydock No. 2 pumphouse) used to superflood. 11 total: 1 at head, 30 fpm at 30k; 2 each side of entrance, 4 north side, 1 south side, 30 fpm at 30; 1 south side, 30 fpm at 30k.																
Portal Crane Maximum Capacities and Heights																	
Hook	5 ft beyond dock centerline	Max height above with hook at dock centerline															
Main Auxiliary	50 lg tons 10 lg tons	104' 9" 142' 4"															
Ship and Industrial Services Furnished at Dock																	
Electrical	Volts	Amp	Receptacles														
Ac, 3 Ph, 60 Hz	11,500	600	1 north side from pad at portable substation can be used for DD. 1 south side at 300 amps.														
Ac, Ph, 60 Hz	460	8,800	14 north side; 14 south side at 400 amps.														
<table><tr><th>Item</th><th>Data</th></tr><tr><td>Fresh Water _____</td><td>6" mains, 1,800 gpm at 50 psi, twelve 2-1/2" outlets and one 4 outlet each side.</td></tr><tr><td>Salt water _____</td><td>12" mains, 6,400 gpm at 150 psi, eight 4" outlets each side.</td></tr><tr><td>Fire protection _____</td><td>Same as saltwater.</td></tr><tr><td>Compressed air _____</td><td>5", 6", and 8" mains, 15,000 cfm at 100 psi, thirty-two 2" outlets each side. 4" headers at dock floor with thirteen 2" outlets each side.</td></tr><tr><td>Steam _____</td><td>6" mains, 30,000 phr at 100 psi, fourteen 2-1/2" outlets each side.</td></tr><tr><td>CHT sewer _____</td><td>8' mains, fourteen 4" inlets each side.</td></tr></table>				Item	Data	Fresh Water _____	6" mains, 1,800 gpm at 50 psi, twelve 2-1/2" outlets and one 4 outlet each side.	Salt water _____	12" mains, 6,400 gpm at 150 psi, eight 4" outlets each side.	Fire protection _____	Same as saltwater.	Compressed air _____	5", 6", and 8" mains, 15,000 cfm at 100 psi, thirty-two 2" outlets each side. 4" headers at dock floor with thirteen 2" outlets each side.	Steam _____	6" mains, 30,000 phr at 100 psi, fourteen 2-1/2" outlets each side.	CHT sewer _____	8' mains, fourteen 4" inlets each side.
Item	Data																
Fresh Water _____	6" mains, 1,800 gpm at 50 psi, twelve 2-1/2" outlets and one 4 outlet each side.																
Salt water _____	12" mains, 6,400 gpm at 150 psi, eight 4" outlets each side.																
Fire protection _____	Same as saltwater.																
Compressed air _____	5", 6", and 8" mains, 15,000 cfm at 100 psi, thirty-two 2" outlets each side. 4" headers at dock floor with thirteen 2" outlets each side.																
Steam _____	6" mains, 30,000 phr at 100 psi, fourteen 2-1/2" outlets each side.																
CHT sewer _____	8' mains, fourteen 4" inlets each side.																

Figure 32 (continued)
Norfolk Naval Shipyard Drydock No. 3

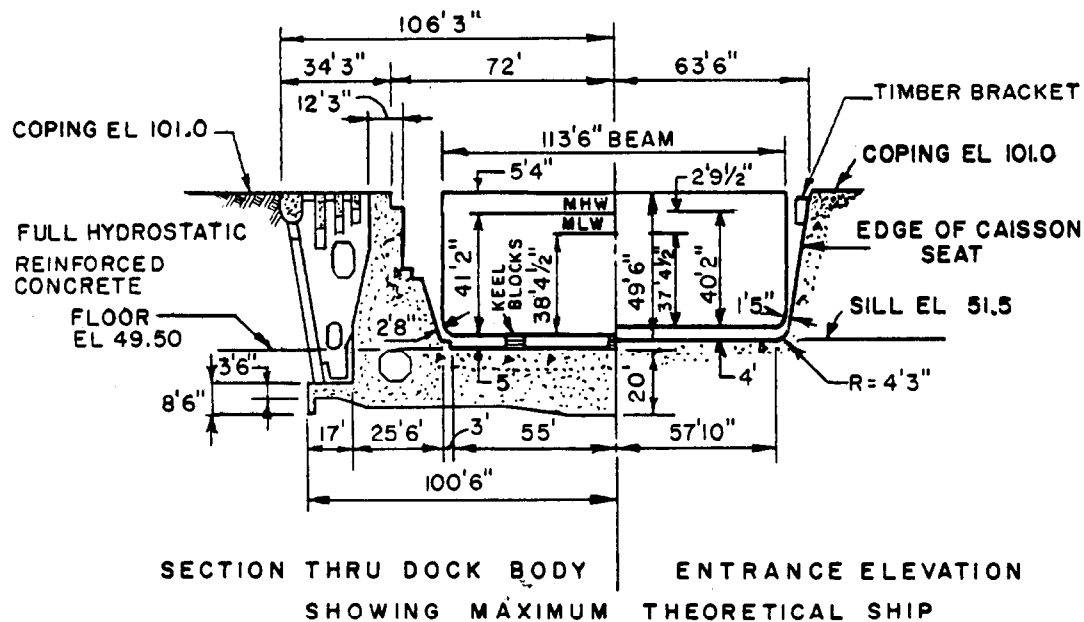
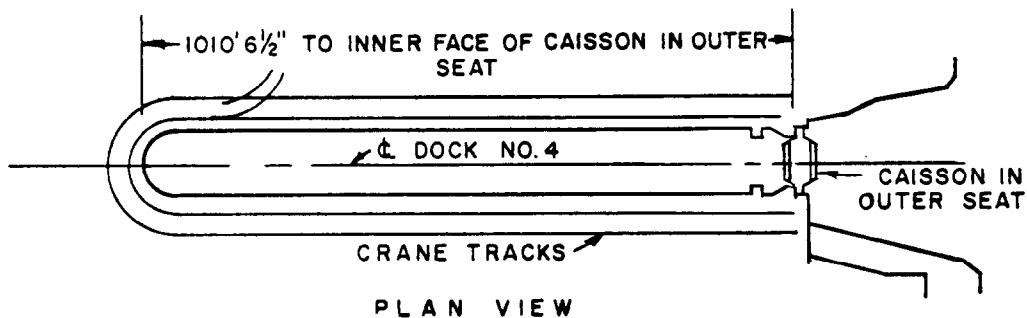
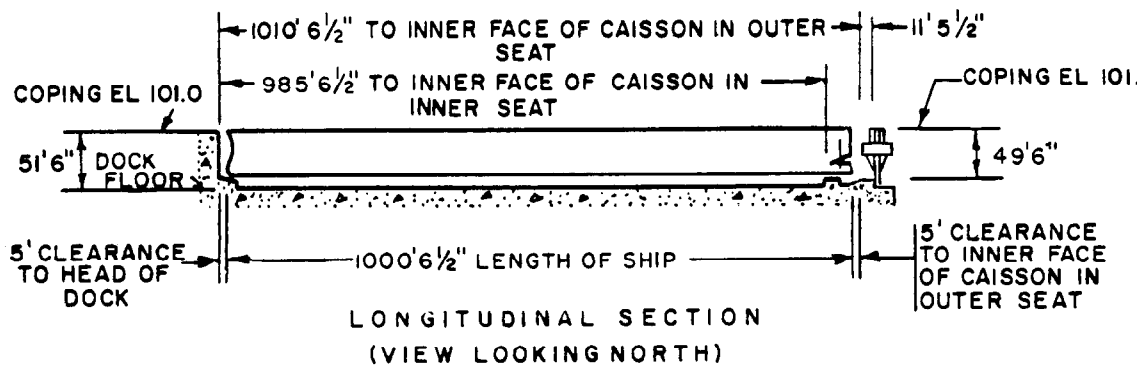


Figure 33
Norfolk Naval Shipyard Drydock No. 4

Date Completed	Suitable for Docking	Foundation	Construction Material														
1919	CV	Earth	Concrete														
<table><tr><td>Item</td><td>Data</td></tr><tr><td>Closure _____</td><td>Caisson, steel (hydrometer type).</td></tr><tr><td>Dewatering pumps_____</td><td>One 54", 1,250 hp, 330,000 gpm; Pumps one also used for Drydock No. 6 and 7. Time to dewater: 135 min.</td></tr><tr><td>Drainage pumps _____</td><td>Two 12", 150 hp, 10,000 gpm. Pumps also used for Drydock No. 6 and 7.</td></tr><tr><td>Flooding _____</td><td>Through culverts. Time to flood: 105 min.</td></tr><tr><td>Capstans _____</td><td>13 total: 1 at head, 1 each side of entrance, 1 at Berths 19 and 20, 2 north side, 3 south side, 50 fpm at 30k; 2 north 2 north side, 1 south side, 7 fpm at 29k.</td></tr></table>				Item	Data	Closure _____	Caisson, steel (hydrometer type).	Dewatering pumps_____	One 54", 1,250 hp, 330,000 gpm; Pumps one also used for Drydock No. 6 and 7. Time to dewater: 135 min.	Drainage pumps _____	Two 12", 150 hp, 10,000 gpm. Pumps also used for Drydock No. 6 and 7.	Flooding _____	Through culverts. Time to flood: 105 min.	Capstans _____	13 total: 1 at head, 1 each side of entrance, 1 at Berths 19 and 20, 2 north side, 3 south side, 50 fpm at 30k; 2 north 2 north side, 1 south side, 7 fpm at 29k.		
Item	Data																
Closure _____	Caisson, steel (hydrometer type).																
Dewatering pumps_____	One 54", 1,250 hp, 330,000 gpm; Pumps one also used for Drydock No. 6 and 7. Time to dewater: 135 min.																
Drainage pumps _____	Two 12", 150 hp, 10,000 gpm. Pumps also used for Drydock No. 6 and 7.																
Flooding _____	Through culverts. Time to flood: 105 min.																
Capstans _____	13 total: 1 at head, 1 each side of entrance, 1 at Berths 19 and 20, 2 north side, 3 south side, 50 fpm at 30k; 2 north 2 north side, 1 south side, 7 fpm at 29k.																
Portal Crane Maximum Capacities and Heights																	
Hook	5 ft beyond dock centerline	Max height above with hook at dock centerline															
Main Auxiliary	50 lg tons 10 lg tons	97' 0", 90" 0" max radius 128'4'															
Ship and Industrial Services Furnished at Dock																	
Electrical	volts	Amp	Receptacles														
Ac, 3 Ph, 60 Hz	11,500	900	1 north side at 300 amps. 2 south side at 500 amps.														
Ac, Ph, 60 Hz	4 6 0	8,000	33 north side and 15 south side at 400 amps.														
<table><tr><td>Item</td><td>Data</td></tr><tr><td>Fresh Water _____</td><td>6" mains, 2,100 gpm at 50 psi, seven 2-1/2' outlets each side.</td></tr><tr><td>Salt water _____</td><td>12" mains, 7,000 gpm at 150 psi, fourteen 4" outlets each side and six 2-1 /2" outlets each side.</td></tr><tr><td>Fire protection_____</td><td>Same as saltwater.</td></tr><tr><td>Compressed air _____</td><td>6" mains, 10,000 cfm at 100 psi, sixteen two 2' outlets each side, sixteen 1-1/4" outlets south side, sixteen 1-1 /4" outlets bottom of dock each side.</td></tr><tr><td>Steam _____</td><td>6" mains, 30,000 phr at 100 psi, twenty 2' outlets each side.</td></tr><tr><td>CHT sewer _____</td><td>8" and 10' mains, twenty-one 4' inlets each side.</td></tr></table>				Item	Data	Fresh Water _____	6" mains, 2,100 gpm at 50 psi, seven 2-1/2' outlets each side.	Salt water _____	12" mains, 7,000 gpm at 150 psi, fourteen 4" outlets each side and six 2-1 /2" outlets each side.	Fire protection_____	Same as saltwater.	Compressed air _____	6" mains, 10,000 cfm at 100 psi, sixteen two 2' outlets each side, sixteen 1-1/4" outlets south side, sixteen 1-1 /4" outlets bottom of dock each side.	Steam _____	6" mains, 30,000 phr at 100 psi, twenty 2' outlets each side.	CHT sewer _____	8" and 10' mains, twenty-one 4' inlets each side.
Item	Data																
Fresh Water _____	6" mains, 2,100 gpm at 50 psi, seven 2-1/2' outlets each side.																
Salt water _____	12" mains, 7,000 gpm at 150 psi, fourteen 4" outlets each side and six 2-1 /2" outlets each side.																
Fire protection_____	Same as saltwater.																
Compressed air _____	6" mains, 10,000 cfm at 100 psi, sixteen two 2' outlets each side, sixteen 1-1/4" outlets south side, sixteen 1-1 /4" outlets bottom of dock each side.																
Steam _____	6" mains, 30,000 phr at 100 psi, twenty 2' outlets each side.																
CHT sewer _____	8" and 10' mains, twenty-one 4' inlets each side.																

Figure 33 (continued)
Norfolk Naval Shipyard Drydock No. 4

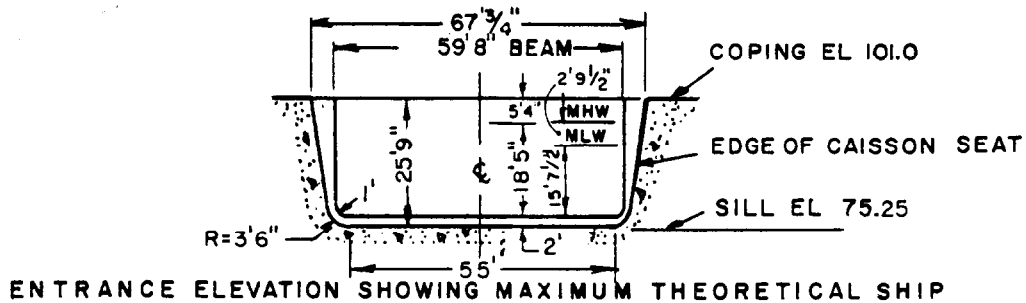
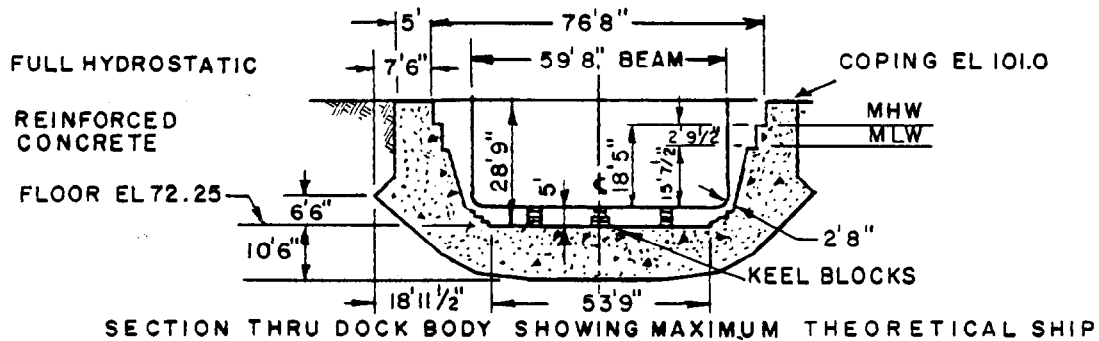
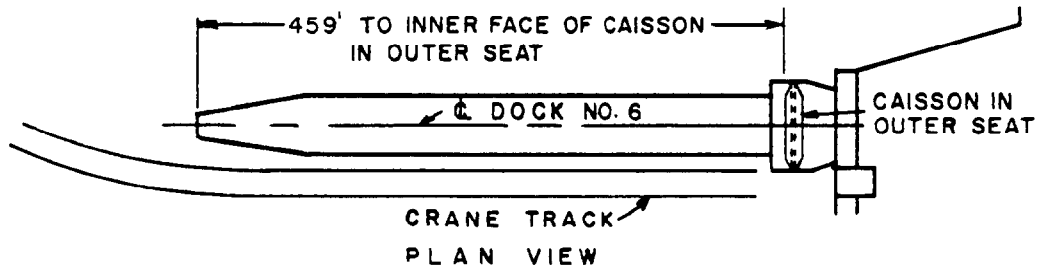
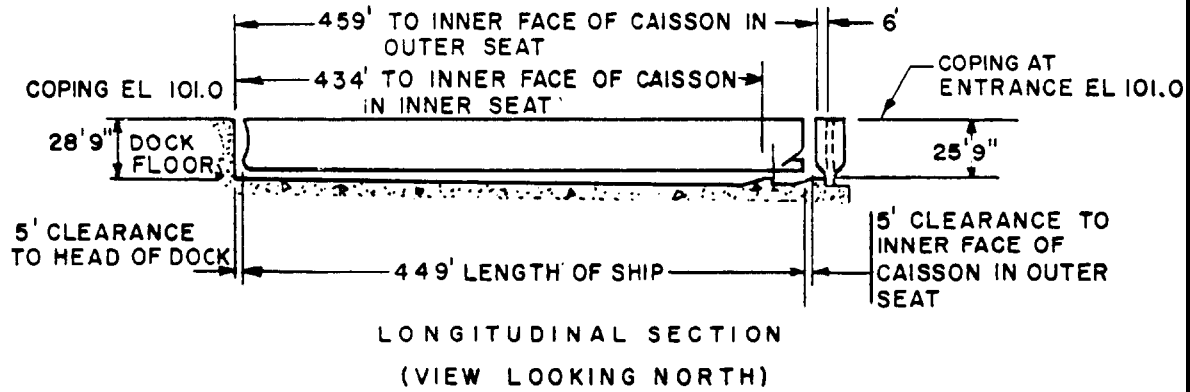


Figure 34
Norfolk Naval Shipyard Drydock No. 6

Date Completed	Suitable for Docking	Foundation	Construction Material
1919	Service craft	Earth	Concrete
Item	Data		
Closure _____	Caisson, steel (rectangular box type).		
Dewatering pumps_____	Three 54", 1,250 hp, 330,000 gpm. (Drydock No. 4 pumphouse).		
	Time to dewater: 15 min.		
Drainage pumps_____	Two 12", 150 hp, 10,000 gpm. (Drydock No. 4 pumphouse).		
Flooding _____	Through caisson. Time to flood: 30 min.		
Capstans _____	Uses south side Drydock No. 3 and north side Drydock No. 7 capstans.		
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main	60 lg tons	109' 10"	
Auxiliary	5 lg tons	152' 0", 64' 0" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	2,000	2 north side and 3 south side at 400 amps.
Item	Data		
Fresh water _____	6" mains, 900 gpm at 50 psi, four 2-1/2" outlets south side, two 2-1/2" outlets at head of dock.		
Salt water _____	12" mains, 3,200 gpm at 150 psi, four 4" outlets each side		
Fire protection _____	Same as salt water.		
Compressed air _____	6" mains, 3,600 cfm at 100 psi, four 2" outlets north side, eight 2" outlets south side.		
Steam _____	4" main, 7,500 phr at 100 psi, ten 2' outlets south side		

Figure 34 (continued)
Norfolk Naval Shipyard Drydock No. 6

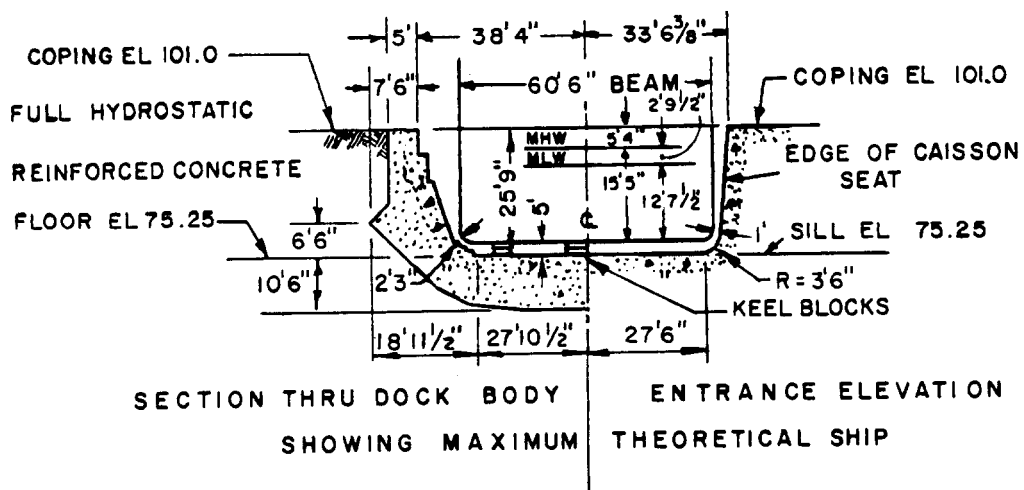
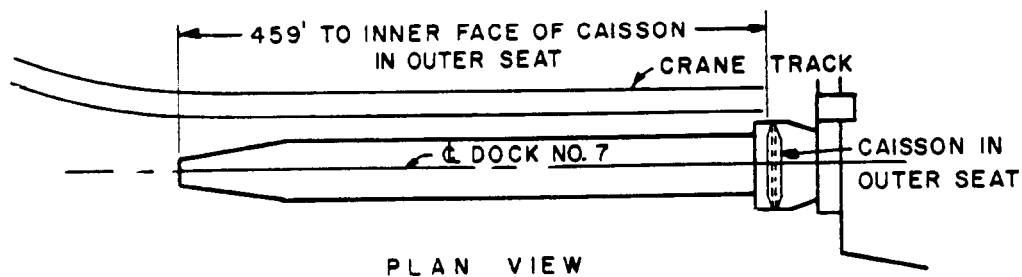
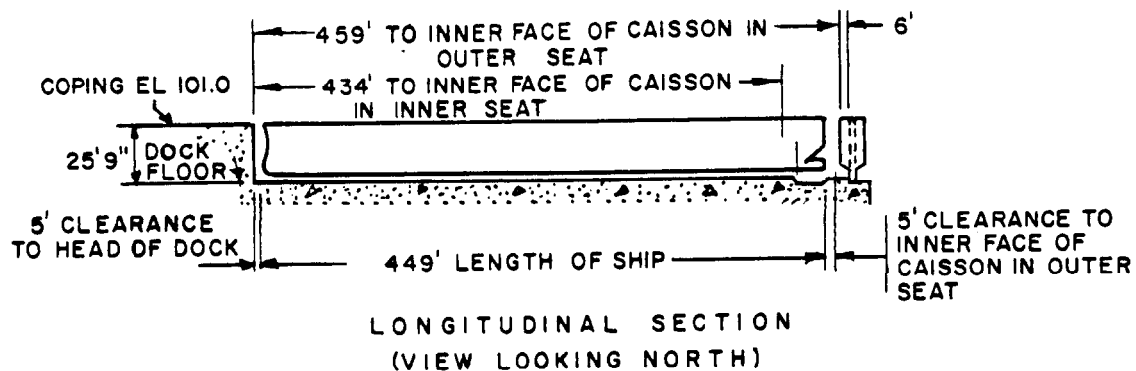


Figure 35
Norfolk Naval Shipyard Drydock No. 7

Date Completed	Suitable for Docking	Foundation	Construction Material
1919	Service craft	Earth	Concrete
Item	Data		
<p>Closure _____ Caisson, steel (rectangular box type).</p> <p>DeWatering pumps — Three 54", 1,250 hp, 330,000 gpm. (Drydock No. 4 pumphouse). Time to dewater 15 min.</p> <p>Drainage pumps — Two 12", 150 hp, 10,000 gpm. (Drydock No. 4 pumphouse).</p> <p>Flooding _____ Through caisson. Time to flood: 30 min.</p> <p>Capstans _____ Total 2: 1 at head, 30 fpm at 30k; 1 north side of entrance, 30 fpm at 30k. Also uses north side Drydock No. 4 capstans.</p>			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main Auxiliary	60 lg tons 5 lg tons	109' 10" 152' 0", 64' 0" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	2,400	3 each side at 400 amps.
Item	Data		
<p>Fresh water _____ 6" mains, 600 gpm at 50 psi, four 2-1/2" outlets north side.</p> <p>Salt water _____ 12" mains, 3,200 gpm at 150 psi, four 4' outlets each side.</p> <p>Fire protection _____ Same as salt water.</p> <p>Compressed air _____ 6" mains, 5,000 cfm at 100 psi, eight 2" outlets north side. Eighteen 1-1/4" outlets south side.</p> <p>Steam _____ 4" main, 7,500 phr at 100 psi, ten 2" outlets north side.</p>			

Figure 35 (continued)
Norfolk Naval Shipyard Drydock No. 7

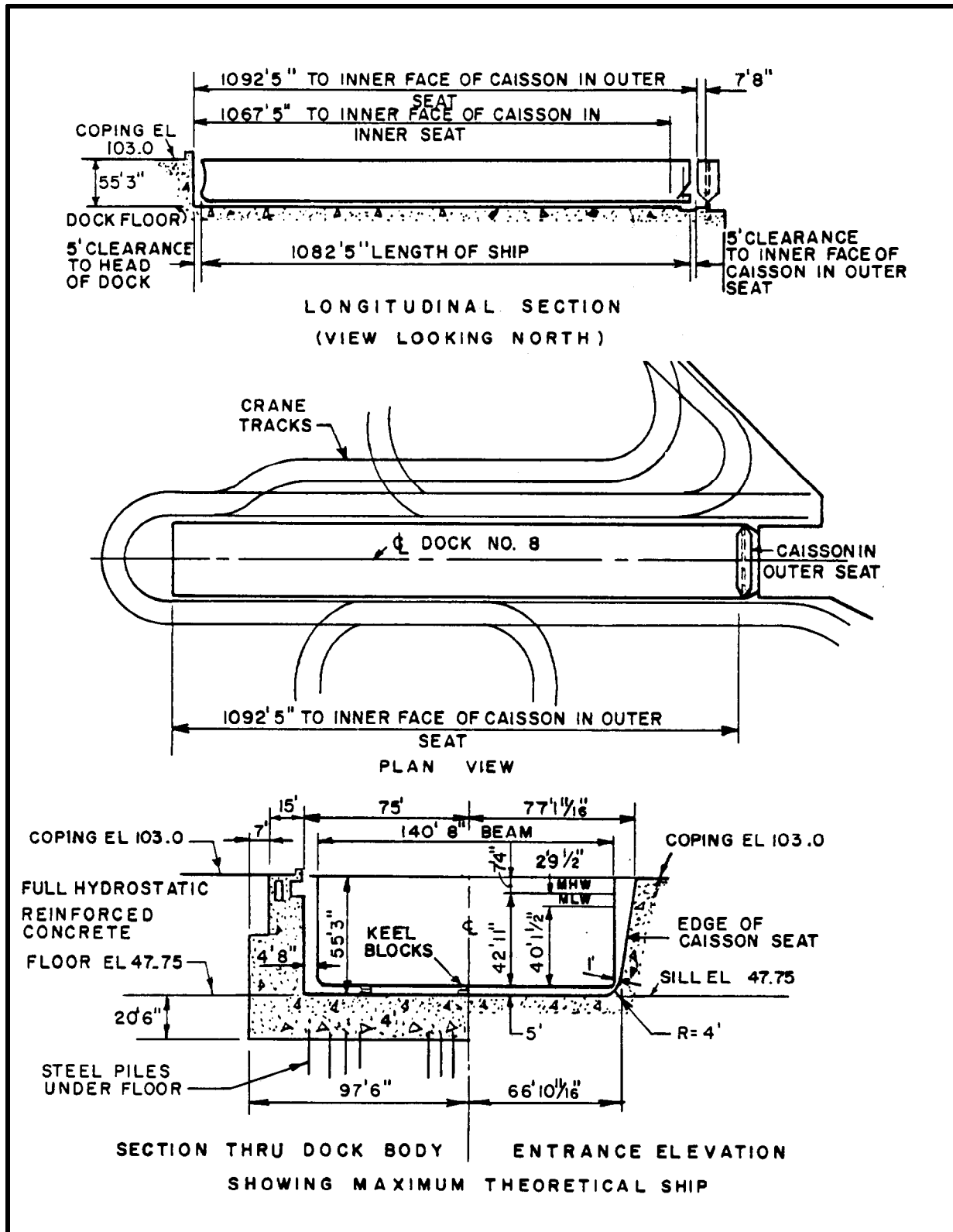


Figure 36
Norfolk Naval Shipyard Drydock No. 8

Date Completed	Suitable for Docking	Foundation	Construction Material
1942	CVN	Piles	Concrete
Closure _____ Caisson, steel (rectangular box type), Dewatering pumps _____ Four 54", 1,200 hp, 520,000 gpm. Time to dewater: 140 min. Drainage pumps _____ Two 16",250 hp, 19,000 gpm. Flooding _____ Through culverts. Time to flood: 105 min. Capstans _____ 14 total: 1 each side of head and of entrance, 30 fpm at 24k; 5 each side, 30 fpm at 12k.			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main Auxiliary	75 lg tons 25 lg tons	93'5" 120'0"	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	11,500	1200	3 north side at 300 amps 2 south side at 300 amps.
Ac, 3 Ph, 60 Hz	460	6,000	16 north side and 38 south side at 400 amps.
Fresh water _____ 6" and 8" mains, 3,250 gpm at 50 psi, twenty 2-1/2" outlets each side. Salt water _____ 16" mains, 11,500 gpm at 150 psi, eleven 4" outlets, nine 2 1/2 outlets each side. Fire protection _____ Same as salt water. Compressed air _____ 8" and 10" mains, 18,350 cfm at 100 psi, forty 2" outlets each side top, forty 2" outlets each side bottom. Two 4" outlets each side bottom. Steam _____ 6" and 10" mains, 79,000 phr at 100 psi, twenty-eight 2" outlets north side, thirty three 2" outlets south side. Oxygen _____ 1" and 1-1/2" mains, 700 cfm at 90 psi, twenty 3/4" outlets each side. CHT sewer _____ 6', 8' and 10' mains, twenty-six 4" inlets each side			

Figure 36 (continued)
Norfolk Naval Shipyard Drydock No. 8

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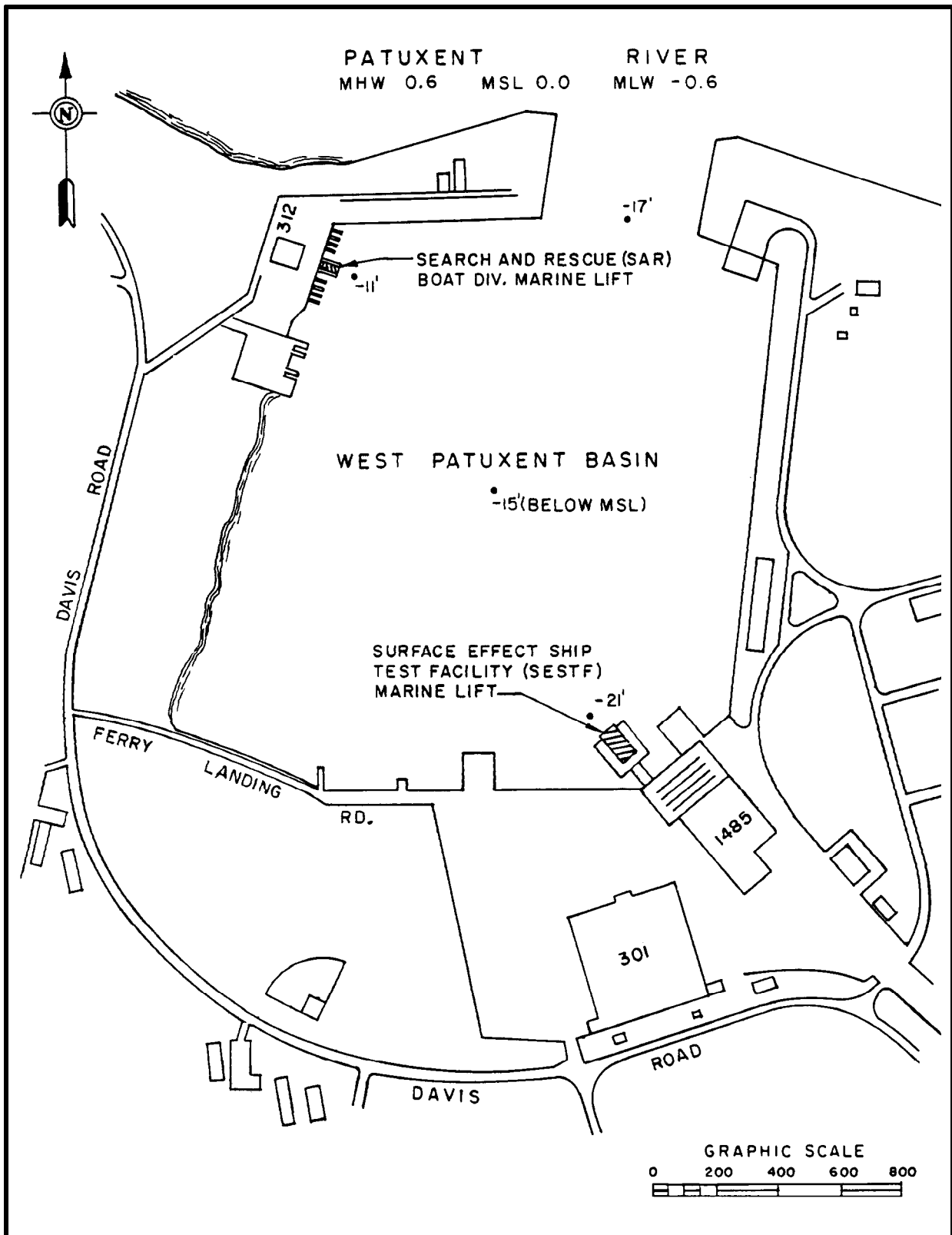


Figure 37
Location of Marine Lifts, Naval Air Station, Patuxent River, Maryland

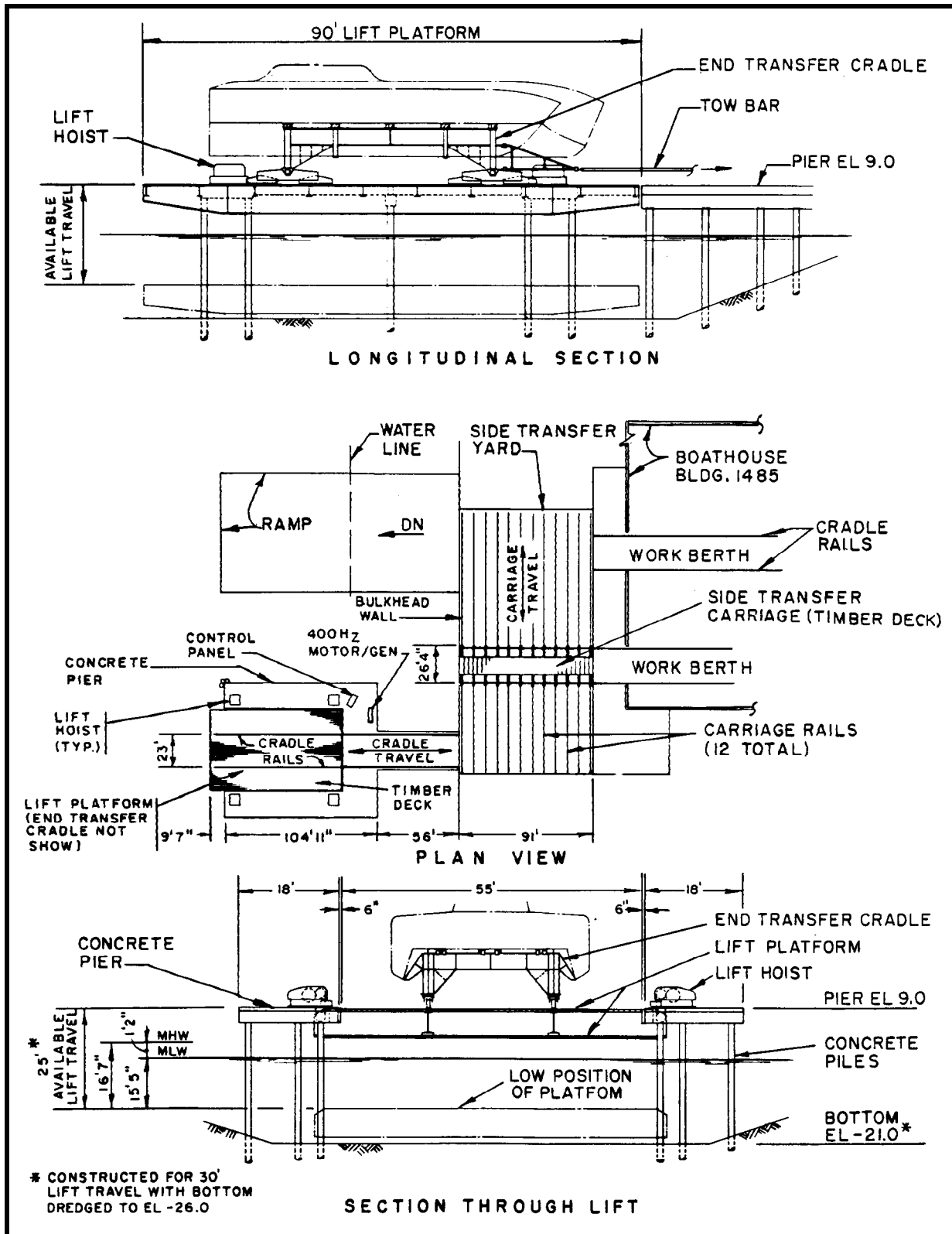


Figure 38
Patuxent River Naval Air Station SESTF Marine Lift

Date constructed _____	1972
capacity _____	250 lg tons.
For docking _____	SES.
Type of lift _____	4 unit syncrolift with transfer systems.
Piers _____	Foundation- Concrete piles. Construction materials- Precast prestressed concrete deck panels and reinforced concrete beams.
Boat winch _____	One motor operated unit on south pier.
Hoists _____	Foundation- Concrete piles and reinforced concrete pile caps. Four 90 lg ton hoists at 60'0" spacing. Motors- Four 7.5 hp. Lifting speed- 1 fpm. Cable-6 part, 1" diameter.
Platform _____	Construction materials- Steel framing with timber deck. Cradle rails- Two 8511 b rails at 23'0" centers. Maximum lifting time- 25 minutes.
Cradle _____	Construction material- Steel framing. Number available- Two. Rocker assemblies- Four per cradle, four 10" diameter wheels per assembly. End transfer- By tow bar and tractor.
Side transfer system _____	Foundation- Reinforced concrete. Rails- Twelve 85 lb rails at 8'0" centers. Carriage- Steel framing with central wood decking. 26'4" wx 90'6" L with seventy-two 10' diameter wheels. Side transfer- By tow bar and tractor.
Boat house _____	Two work berths, each having rail length of approximately 145 ft.
Electrical service _____	Ac, 3 ph, 60 hz, 460 v, 400 amps; One 200 and three 60 amp receptacles on east side; One 60 amp receptacle on west side. Ac, 3 ph, 400 hz, 115/200v, 216 amps; Two 200 amp receptacles on south side.
Fresh water _____	1-1/2' main, 470 gpm at 50 psi, two 1-1/2 and two 3/4' outlets on west side.
Fire protection _____	Shore hydrant, 1,000 gpm at 125 psi.
Fuel _____	2" and 3" mains, two 2-1/2' outlets each side.
Cranes _____	Bridge crane over west work berth of boat house, 2 tons. Mobil crane in side transfer area, 10 tons.

Figure 38 (continued)
Patuxent River Naval Air Station SESTF Marine Lift

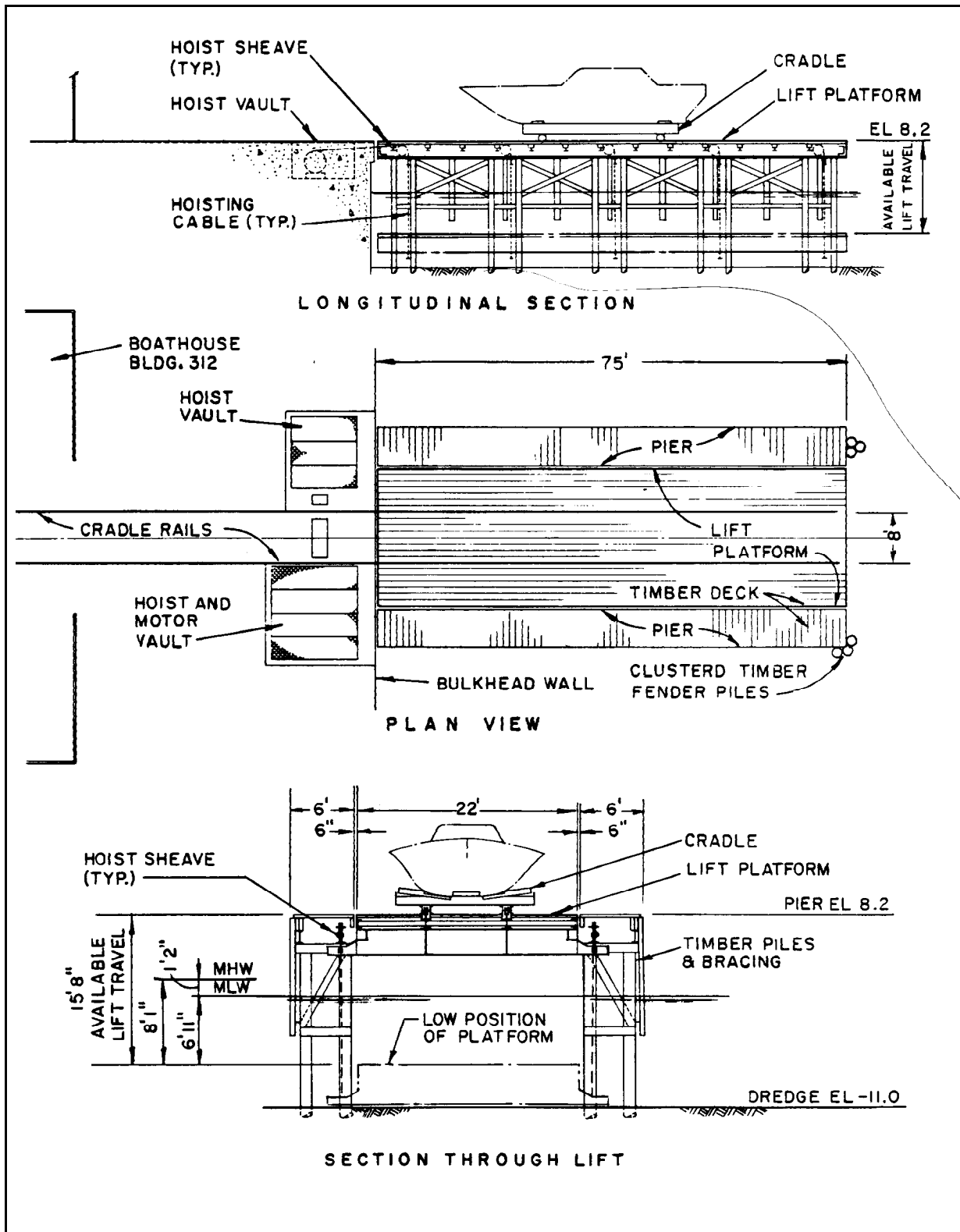


Figure 39
Patuxent River Naval Air Station SAR Marine Lift

Date constructed _____	1942 (Lift platform reconstructed in 1972).
capacity _____	80 lg tons.
For docking _____	Station craft.
Type of lift _____	2 Hoist multi-cable lift with end transfer system.
Piers _____	Foundation- Timber piles.
	Construction materials- Wood and steel beams with timber deck.
	Ten 24" diameter hoisting cable sheaves (5 each pier).
Hoists	Foundation- Reinforced concrete onshore vaults.
	Two 30 lg ton hoists interconnected by a common drive shaft,
	Motor-One 55 hp. Lifting Speed-1 fpm.
	Cable- Five 1" diameter cables each hoist.
Platform _____	Construction materials- Steel framing with timber deck.
	Cradle rails- Two 40 lb rails at 8'0" centers.
	Maximum lifting time- 15 minutes.
Cradle _____	Construction material- Steel framing. Number available- Two.
	Number of wheels-Sk 10 diameter. End transfer- Manual.
Boat house _____	One work berth having rail length of approximately 100 ft
Cranes _____	One 2-1 /2 ton monorail in boat house,

Figure 39 (continued)
Patuxent River Naval Air Station SAR Marine Lift

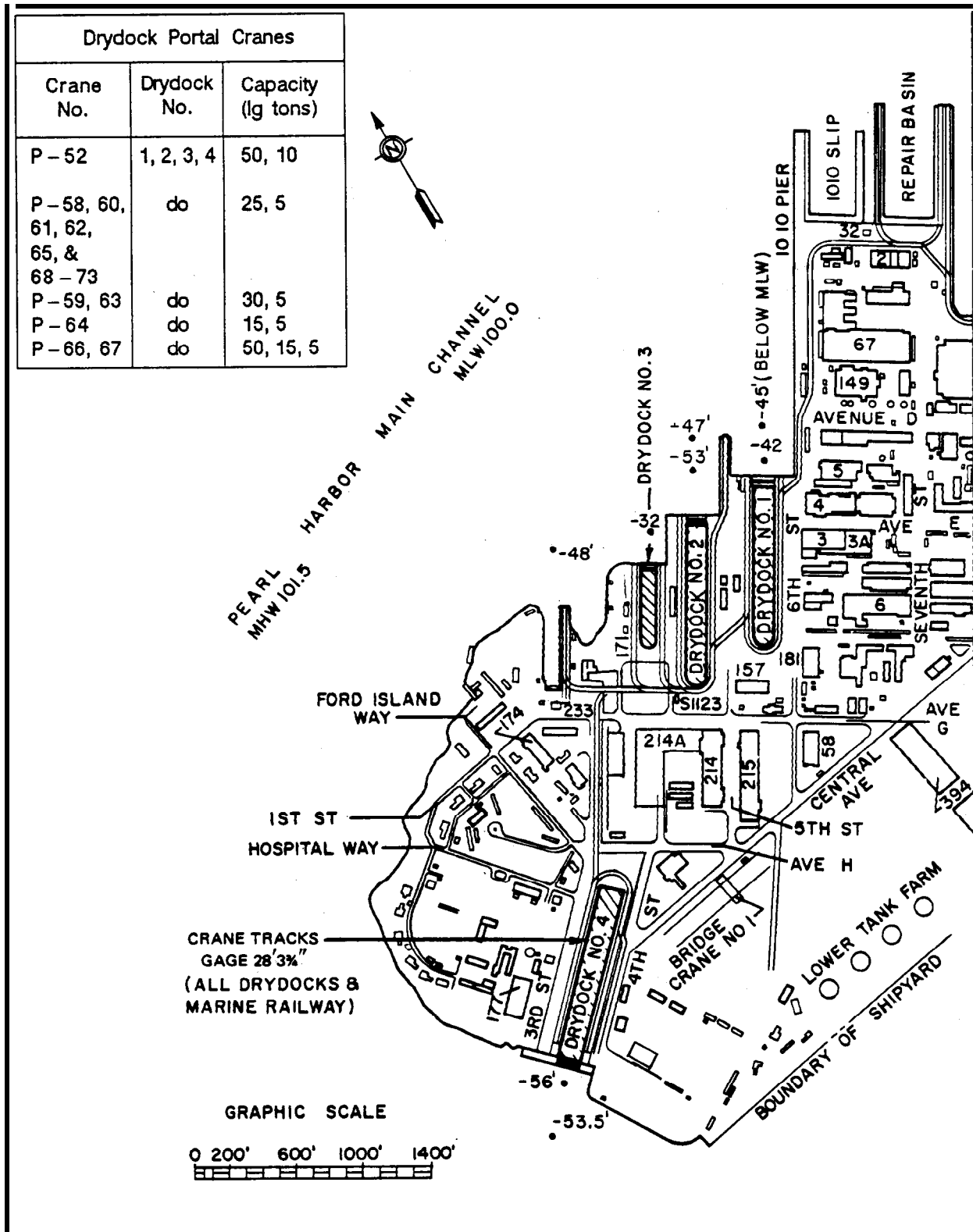


Figure 40
Location-of Drydocks,
Pearl Harbor Naval Shipyard, Oahu, Hawaii

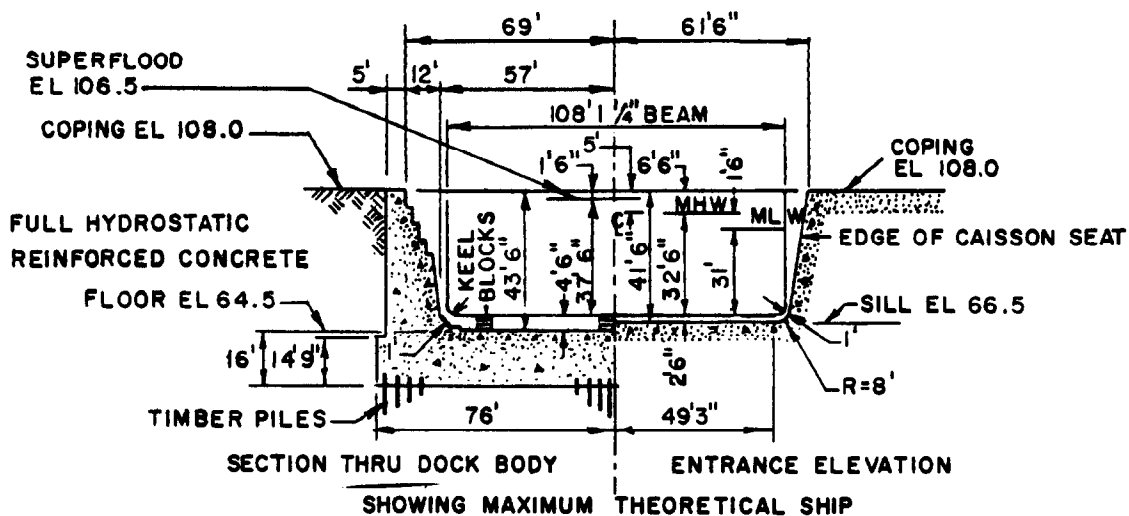
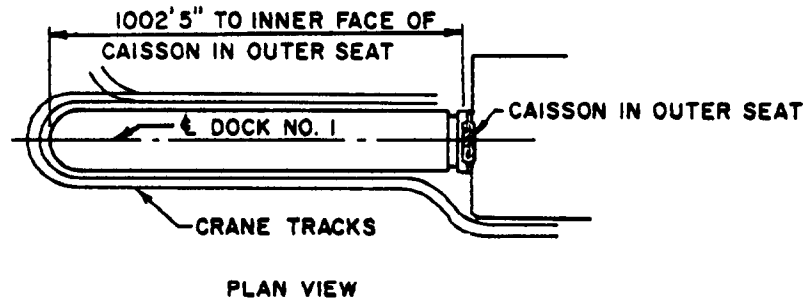
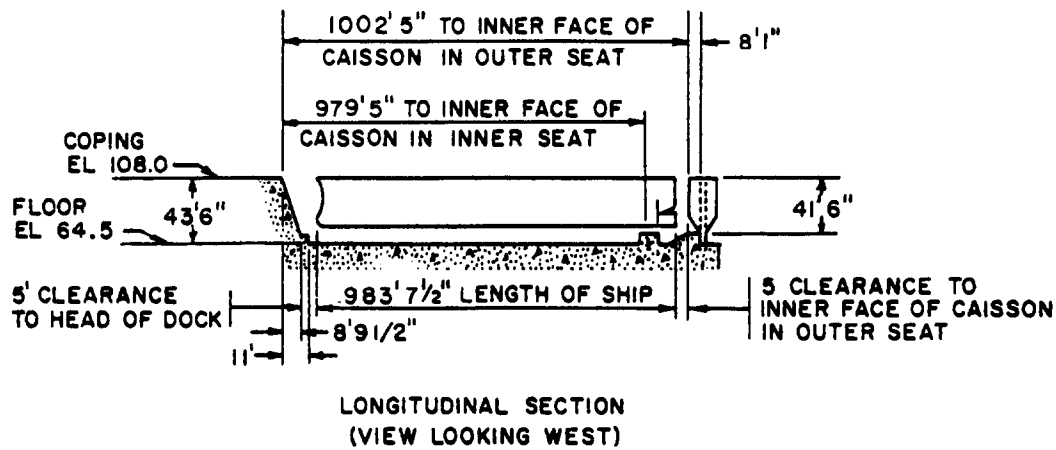


Figure 41
Pearl Harbor Naval Shipyard Drydock No. 1

Date Completed	Suitable for Docking	Foundation	Construction Material
1919	CVA	Piles	Concrete
Item	Data		
Closure _____ Caisson, steel (rectangular box type). DeWatering pumps_____Four 48", 500 hp, 264,000 gpm. Also connected to Drydock No. 2 pumphouse. Time to dewater: 140 min. Drainage pumps_____Two 15", 85 hp, 13,750 gpm. Flooding_____Through caisson and culverts. Time to flood: 60 min. Superflooding pumps two 30", 100 hp, 48,000 gpm. Capstans_____10 total: 1 at head, 1 each side of entrance, 30 fpm at 24k; 4 port side, 3 starboard side, 30 fpm at 12k.			
Portal Crane Maximum Capacities and Heights.			
Hook	5 ft beyond dock centerline	Max height above coping with - hook at dock centerline	
Main Auxiliary Whip	50 lg tons 15 lg tons 5 lg tons	86' 9" 135' 6" 146' 1", 83' 9" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 80 HZ	460	22,800	2 stbd and 4 port at 400 amps. 2 stbd and 2 port at 2,000 amps. 1 port at 4,800 amps. 1 port at 8,000 amps.
Item	Data		
Fresh water _____	8" starboard and 12" port side mains, 1,500 gpm at 85 psi, 12 2-1/2" outlets port side, four 2-1/2" outlets starboard side.		
Salt water _____	12" starboard and 12" port side mains, 8,700 gpm at 125 psi, forty-eight 2-1/2" outlets port side, thirty-two 2-1/2" outlets starboard side. 6" header at dock floor with outlets.		
Fire protection _____	Same as salt water, except pressure boosted to 150 psi		
Compressed air _____	4" starboard and 8" port side mains, 10,000 cfm at 100 psi, ten 1-1/4" and five 2-1/2" outlets port side, twelve 1-1/4" and six 2-1/2' outlets starboard side.		
Steam _____	4" main, 10,000 phr at 100 psi, fifteen 1-1/2" starboard side.		
Sanitary sewer _____	8" mains, 1,000 gpm, twenty-two 6" inlets each side.		

Figure 41 (continued)
 Pearl Harbor Naval Shipyard Drydock No. 1

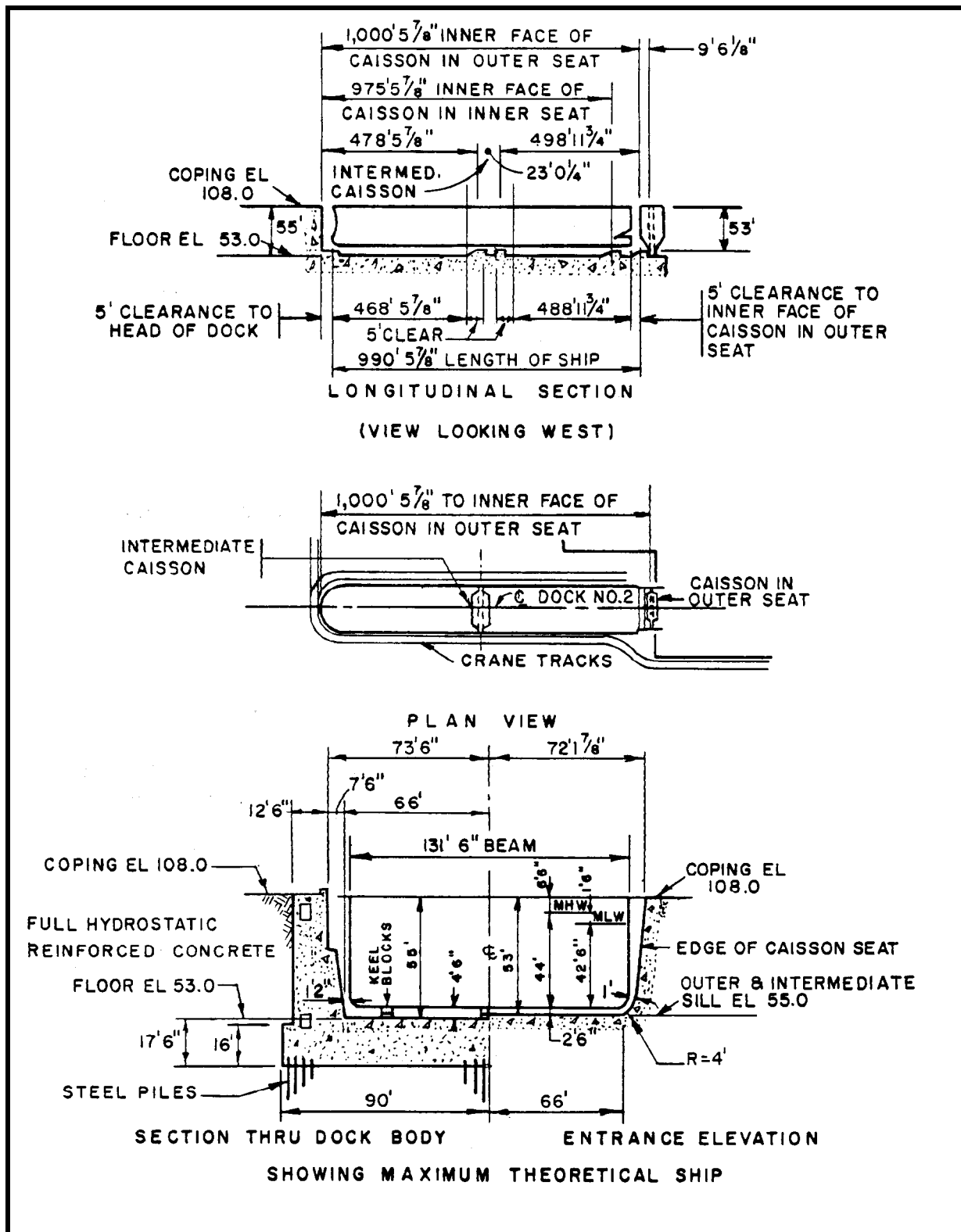


Figure 42
Pearl Harbor Naval Shipyard Drydock No. 2

Date Completed	Suitable for Docking	Foundation	Construction Material
1941	CVA	Piles	Concrete
Item	Data		
Closure _____	Caisson, steel (rectangular box type). Also identical intermediate caisson available as spare		
Dewatering pumps_____	Four 52", 1,250 hp, 520,000 gpm. Also connected to Drydock No. 1 pumphouse.		
Drainage pumps_____	Time to dewater: 90 min, aft section; 140 min. total dock.		
Flooding_____	Two 16", 250 hp, 14,400 gpm; two 16", 200 hp, 12,000 gpm.		
Capstans_____	Through culverts. Time to flood: 75 rein, aft section; 90 min. total dock.		
	13 total: 1 at head, 1 each side of entrance, 30 fpm at 24k; 5 each side, 30 fpm at 12k.		
Ports! Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main	50 lg tons	82' 1"	
Auxiliary	15 lg tons	128' 10"	
Whip	5 lg tons	138' 10", 83'9" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
AC) 3 Ph, 60 Hz	460	23,400	6 stbd and 7 port at 600 amps. 2 stbd and 2 port at 2,000 amps. 2 port at 4,800 amps.
Item	Data		
Fresh water _____	6" mains, 2,800 gpm at 65 psi, twelve 2-1/2" outlets each side.		
Salt water _____	12" mains, 8,700 gpm at 125 psi, forty-eight 2-1/2" outlets each side, 4" header at dock floor with outlets.		
Fire protection _____	Same as salt water, expect pressure boosted to 150 psi.		
Sea Water Cooling_____	16" main, 8,000 gpm at 25 psi, four 12" outlets port side.		
Compressed air_____	6" mains, 10,000 cfm at 100 psi, six 2-1/2" and twelve 1-1/4" outlets each side.		
Steam _____	6" mains, 10,000 phr at 100 psi, twelve 1-1/2" outlets each side.		
Sanitary sewer_____	8" mains, 550 gpm, twenty-three 6" inlets each side.		

Figure 42 (continued)
Pearl Harbor Naval Shipyard Drydock No. 2

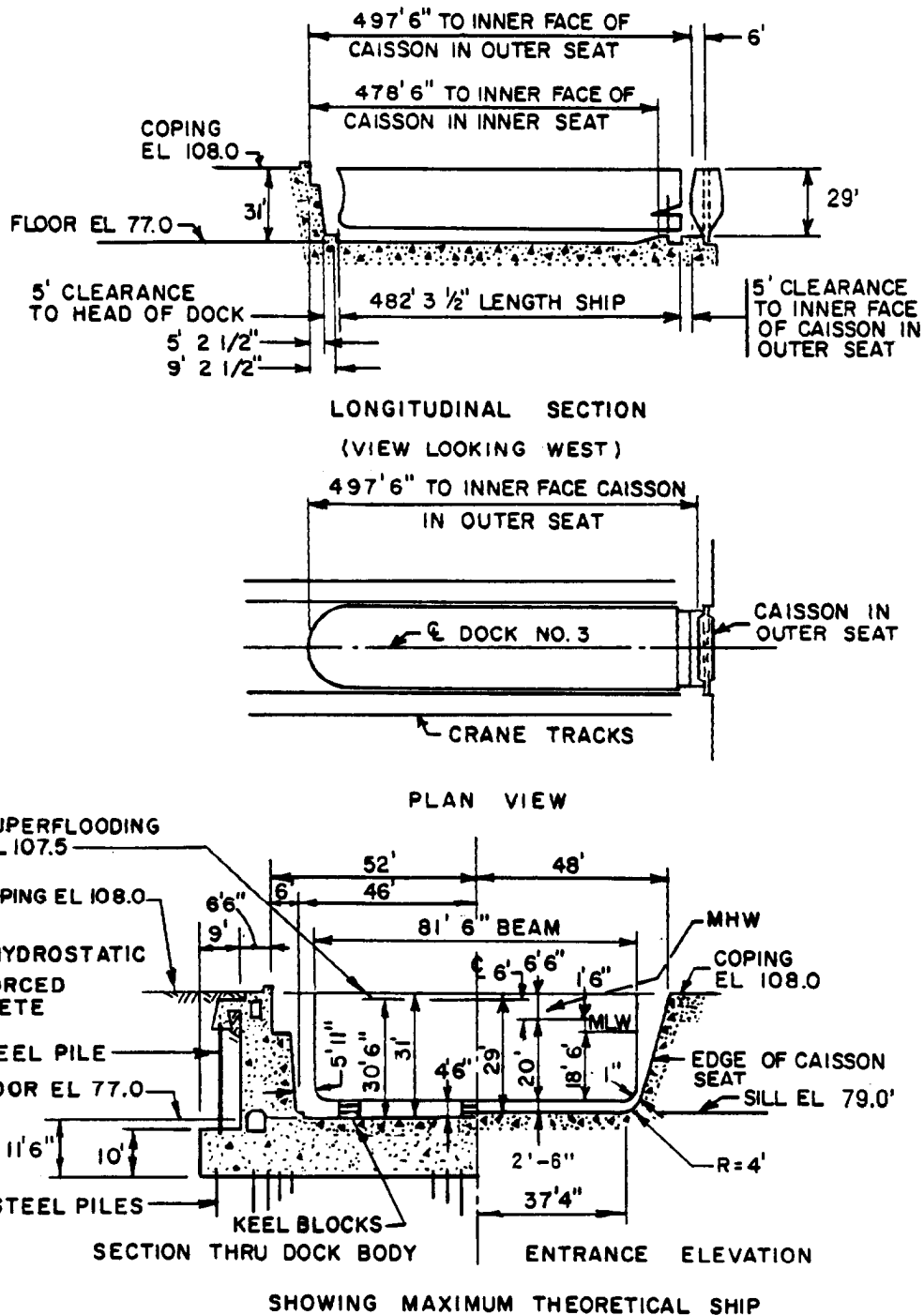


Figure 43
 Pearl Harbor Naval Shipyard Drydock No. 3

Date Completed	Suitable for Docking	Foundation	Construction Material			
1942	DD, SSBN	Piles	Concrete			
Item	Date					
Closure _____ Caisson, steel (rectangular box type). DeWatering pumps _____ Dewatered by Drydock No. 1 or 2 pumps. Time to dewater: 40 min. Drainage pumps _____ One 10", 75 hp, 3,000 gpm. Drydock No. 2 pumps also used. flooding _____ Through culverts. Time to flood: 45 min. Super-flooding pumps: three 12", 100 hp, 19,500 gpm. Capstans _____ 5 total: 1 at head, 30 fpm at 24k; 1 each side of entrance, 1 each side, 30 fpm at 12k.						
Portal Crane Maximum Capacities and Heights						
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline				
Main Auxiliary Whip	50 lg tons 15 lg tons 5 lg tons	97' 4" 143' 0" 149' 0", 83' 9" min radius				
Ship and Industrial Services Furnished at Dock						
Electrical	Volts	Amp	Receptacles			
Ac, 3 Ph, 60 Hz	460	8000	2 stbd and 3 port at 400 amps. 1 stbd at 1,600 amps. 1 stbd at 4,800 amps.			
Item	Data					
Fresh water _____ 6" mains, 1,050 gpm at 65 psi, three 2-1/2" outlets each side. Salt water _____ 8" mains, 8,700 gpm at 125 psi, twelve 2-1/2" outlets each side, 4" header at dock floor with outlets. Fire protection _____ Same as salt water, except pressure boosted to 150 psi. Compressed air _____ 4" main, 10,000 cfm at 100 psi, three 2-1/2" outlets each side, six 1-1/4" outlets each side. Steam _____ 4" mains, 10,000 phr at 100 psi, six 1-1/2" outlets each side. Sanitary sewer _____ 8" mains, 200 gpm, twenty-two 6" inlets each side.						

Figure 43 (continued)
 Pearl Harbor Naval Shipyard Drydock No. 3

Diagram illustrating the layout of Dock No. 4, showing the crane tracks and the caisson in the outer seat. The distance from the inner face of the caisson to the inner seat is 1,088' 6".

SECTION THRU DOCK BODY

ENTRANCE ELEVATION

Labels and Dimensions:

- 77' 6"
- 76' 7 1/4"
- 68' 7 7/8"
- 135' 2 3/8" BEAM
- 10' 6"
- 1' 6"
- 1' 6"
- 42' 6"
- 4' 6"
- 1'
- 5' 9 5/8"
- 59"
- 44"
- 4' 6"
- 1'
- 16'
- 13' 6"
- 2' 6"
- 4'
- 19'
- 17' 6"
- 69' 11 5/16"
- COPING EL 112.0
- FLOOR EL 53.0
- SILL EL 53.0
- FULL HYDROSTATIC REINFORCED CONCRETE
- TIMBER GUARD
- EDGE OF CAISSON SEAT
- MHWM, MLW
- KEEL BLOCKS
- TIMBER PILES

SHOWING MAXIMUM THEORETICAL SHIP

90

Date Completed	Suitable for Docking	Foundation	Construction Material
1943	CVN	Piles	Concrete
Item	Data		
Closure _____ Caisson, steel (rectangular box type). Dewatering pumps_ Four 63", 1,250 hp, 668,000 gpm. Time to dewater: 190 min. Drainage pumps — Two 12", 150 hp, 10,000 gpm. Flooding _____ Through culverts. Time to flood: 120 min. Capstans _____ 13 total: 1 at head, 1 each side of entrance, 30 fpm at 24k; 5 each side, 30 fpm at 12k.			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main Auxiliary Whip	50 lg tons 15 lg tons 5 lg tons	79' 1" 124' 6" 134' 2", 83' 9" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	Volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	21,200	4 stbd and 3 port at 400 amps. 1 port at 1,600 amps. 2 port and 2 stbd at 2,000 amps. 2 port at 4,800 amps.
Item	Data		
Fresh water _____ 6" mains, 2,100 gpm at 65 psi, twelve 2-1/2" outlets each side. Salt water _____ 14" mains, 10,600 gpm at 125 psi, forty-eight 2-1/2' outlets each side, 8" headers at dock floor with outlets. Fire protection _____ Same as salt water, expect pressure boosted to 150 psi. Compressed air _____ 6" mains, 10,000 cfm at 100 psi, six 2-1/2 and twelve 1-1/4" outlets each side. 4" headers at dock floor with outlets. Steam _____ 6" mains, 10,000 phr at 100 psi, twelve 1-1/2" outlets each side. Sanitary sewer _____ 8" mains, 450 gpm, twenty-eight 6" inlets each side.			

Figure 44 (continued)
 Pearl Harbor Naval Shipyard Drydock No. 4

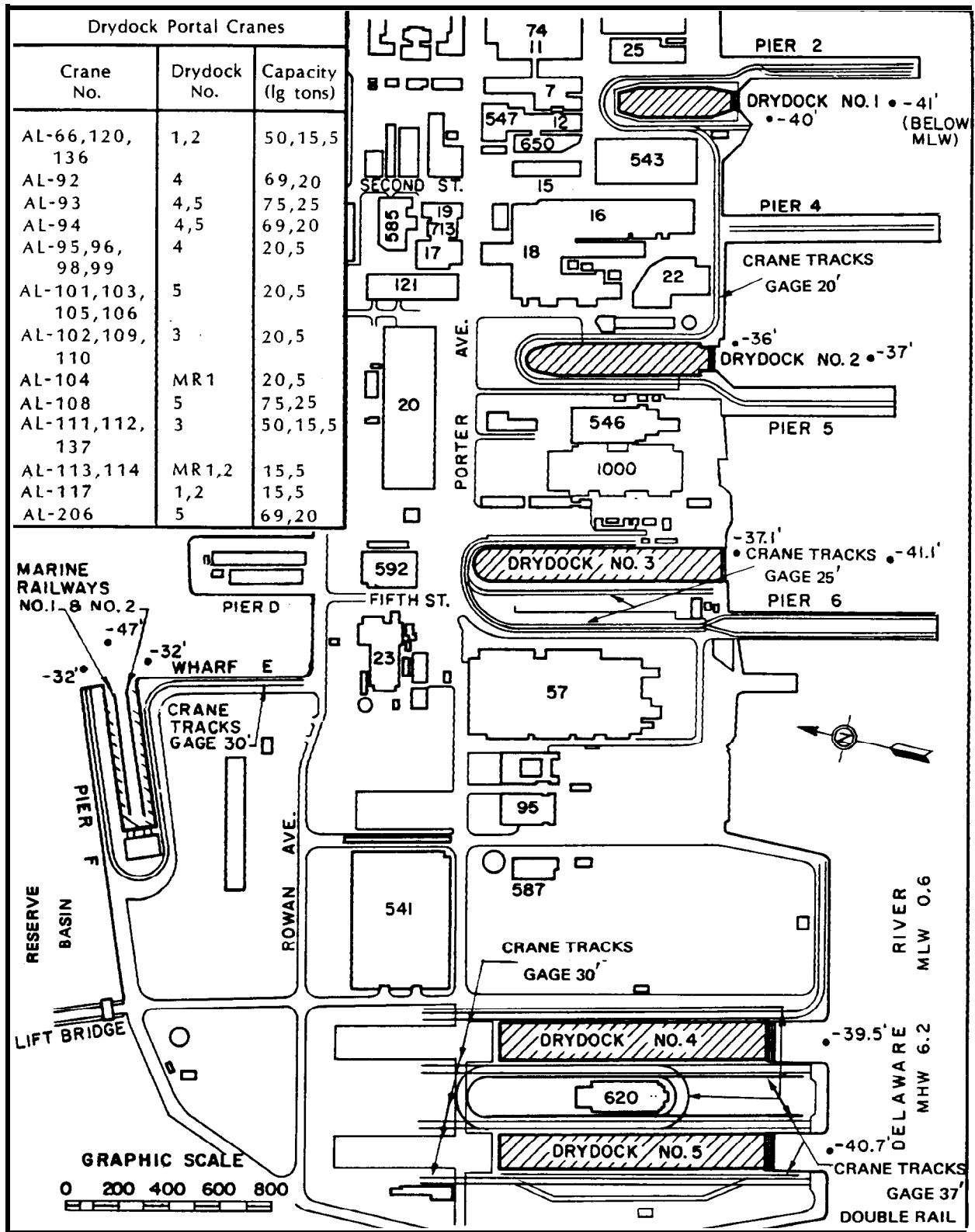


Figure 45
Location of Drydocks and Marine Railways, Philadelphia Naval Shipyard,
Philadelphia, Pennsylvania

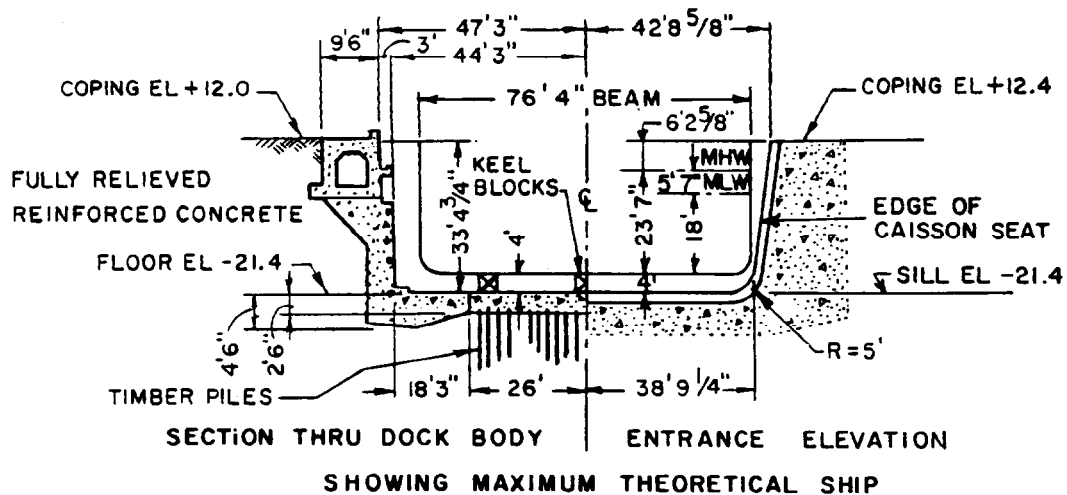
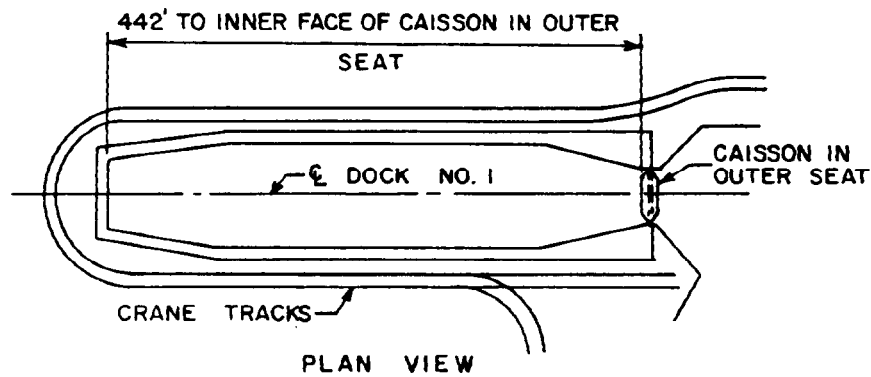
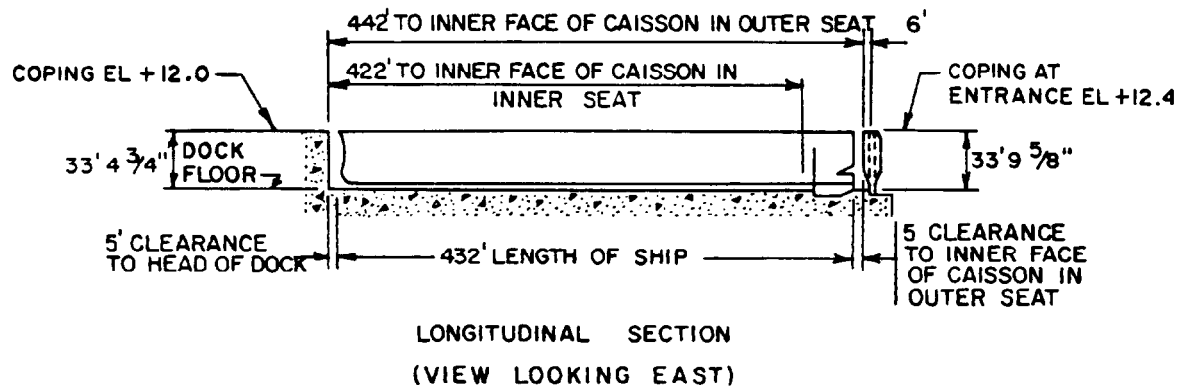


Figure 46
Philadelphia Naval Shipyard Drydock No. 1

Date Completed	Suitable for Docking	Foundation	Construction Material
1956	DD, SS	Piles	Concrete
<div>Closure _____ Caisson, steel (rectangular box type).</div> <div>Dewatering pumps_____ Two 36", 500 hp, 68,000 gpm.</div> <div>Time to dewater: 90 min.</div> <div>Drainage pumps _____ Two 16", 125 hp, 15,000 gpm.</div> <div>Flooding _____ Through culverts. Time to flood: 60 min.</div> <div>Capstans _____ 4 total: 1 at head, 12 fpm at 35k; 1 each side of entrance, 30 fpm at 12k; 1 west side, 10 fpm at 20k.</div>			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main	50 lg tons	125' 9"	
Auxiliary	15 lg tons	161' 0"	
Whip	5 lg tons	175' 0", 85' 0" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	Volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	2,800	4 each side at 400 amps.
<div>Fresh water _____ 6" and 8" mains, 800 gpm at 45 psi, four 2-1/2" outlets east side, five 2-1/2" outlets west side.</div> <div>River water _____ 8" mains, 2,800 gpm at 125 psi, four 4" outlets each side.</div> <div>Fire protection_____ Same as river water. Two 1,400 gpm at 102 psi river water booster pumps.</div> <div>Compressed air _____ 6" mains, 5,000 cfm at 1 W psi, thirty 1 -1/4" outlets.</div> <div>Steam _____ 6" mains, 40,000 phr at 100 psi, seven 2' and nine 1 -1/2" outlets.</div> <div>Oxygen _____ 3" mains, 800 cfm at 100 psi, 3/4" outlets.</div> <div>Sanitary sewer _____ 8" mains, 500 gpm, twenty-one 4" inlets each side.</div> <div>MAPP gas _____ 2" mains, 5 psi, seven 3/4" outlets east side, five 3/4" outlets west side.</div>			

Figure 46 (continued)
Philadelphia Naval Shipyard Drydock No. 1

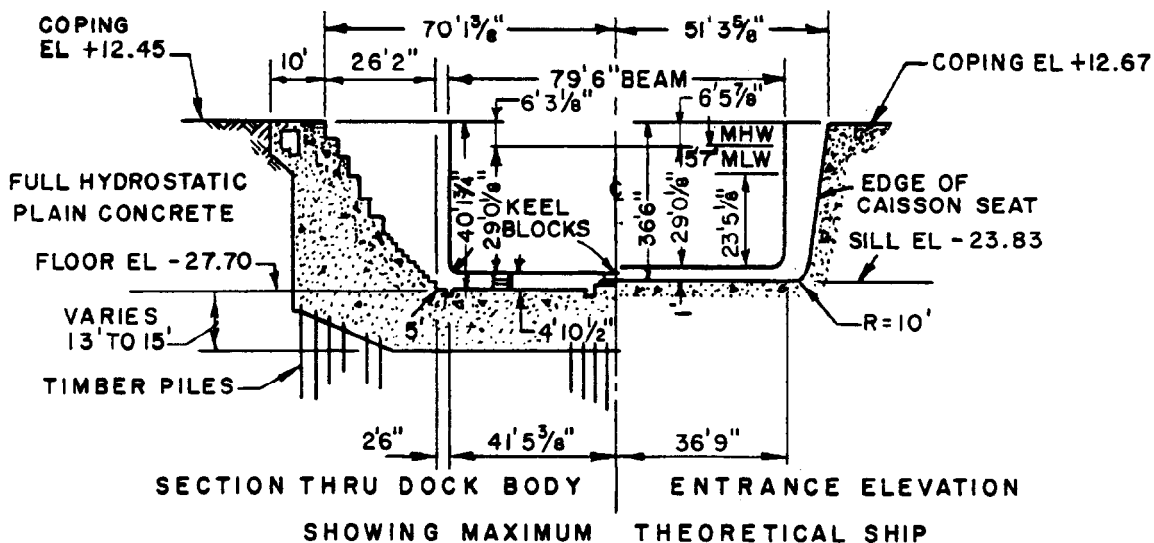
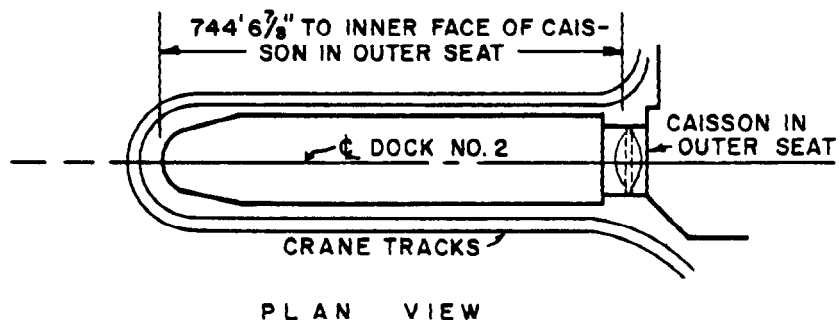
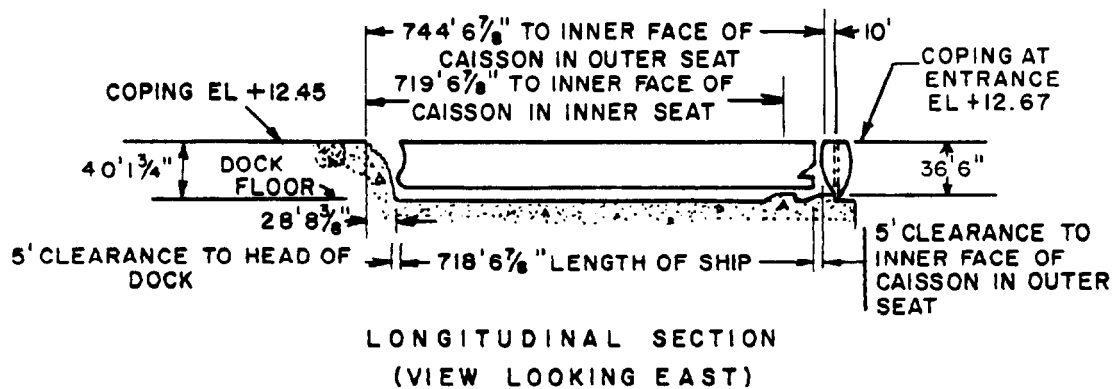


Figure 47
Philadelphia Naval Shipyard Drydock No. 2

Date Completed	Suitable for Docking	Foundation	Construction Material
1908	CA	Piles	Concrete
<div>Closure _____ Caisson, steel (ship type).</div> <div>Dewatering pumps_____ Three 45",400 hp, 186,000 gpm.</div> <div>Time to dewater: 120 min.</div> <div>Drainage pumps _____ One 20", 125 hp, 7,000 gpm; one 10", 60 hp, 3,500 gpm.</div> <div>Flooding _____ Through caisson. Time to flood: 90 min.</div> <div>Capstans _____ 9 total: 1 at head, 1 at west side of entrance, 25 fpm</div> <div>at 20k; 1 east side of entrance, 3 each side, 25 fpm at 9k.</div>			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft & beyond dock centerline	Max height above coping with hook at dock centerline	
Main	50 lg tons	118' 2"	
Auxiliary	15 lg tons	161' 0"	
Whip	5 lg tons	173' 8", 85' 0" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	Volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	10,400	4,000 amp bus each side: 3 east side and 4 west side at 400 amps.
<div>Fresh water _____ 6" mains, 800 gpm at 45 psi, eight 2-1/2" and two 1-1/2" outlets east side, four 2-1/2 and three 1-1/2" outlets west side.</div> <div>River water _____ 10" mains, 4,200 gpm at 140 psi, fourteen 4" outlets each side, one 2-1/2" outlet east side.</div> <div>Fire protection _____ Same as river water. Two 2,100 gpm at 108 psi river water booster pumps.</div> <div>Compressed air _____ 4" mains, 3,600 cfm at 100 psi, thirty-four 1 -1/4" and six 1" outlets. 3" headers at dock floor with outlets.</div> <div>Steam _____ 6" and 8" mains, 80,000 phr at 100 psi, seventeen 2" and two 1-1 /4" outlets.</div> <div>Oxygen _____ 2-1/2" mains, 450 cfmat100 psi, seventeen 3/4' outlets.</div> <div>Sanitary sewer _____ 6" mains, 400 gpm, fifteen 4" inlets each side.</div> <div>MAPP gas _____ 2-1/2" mains, 5 psi, eight 3/4" outlets east side, seven 3/4" outlets west side.</div>			

Figure 47 (continued)
Philadelphia Naval Shipyard Drydock No. 2

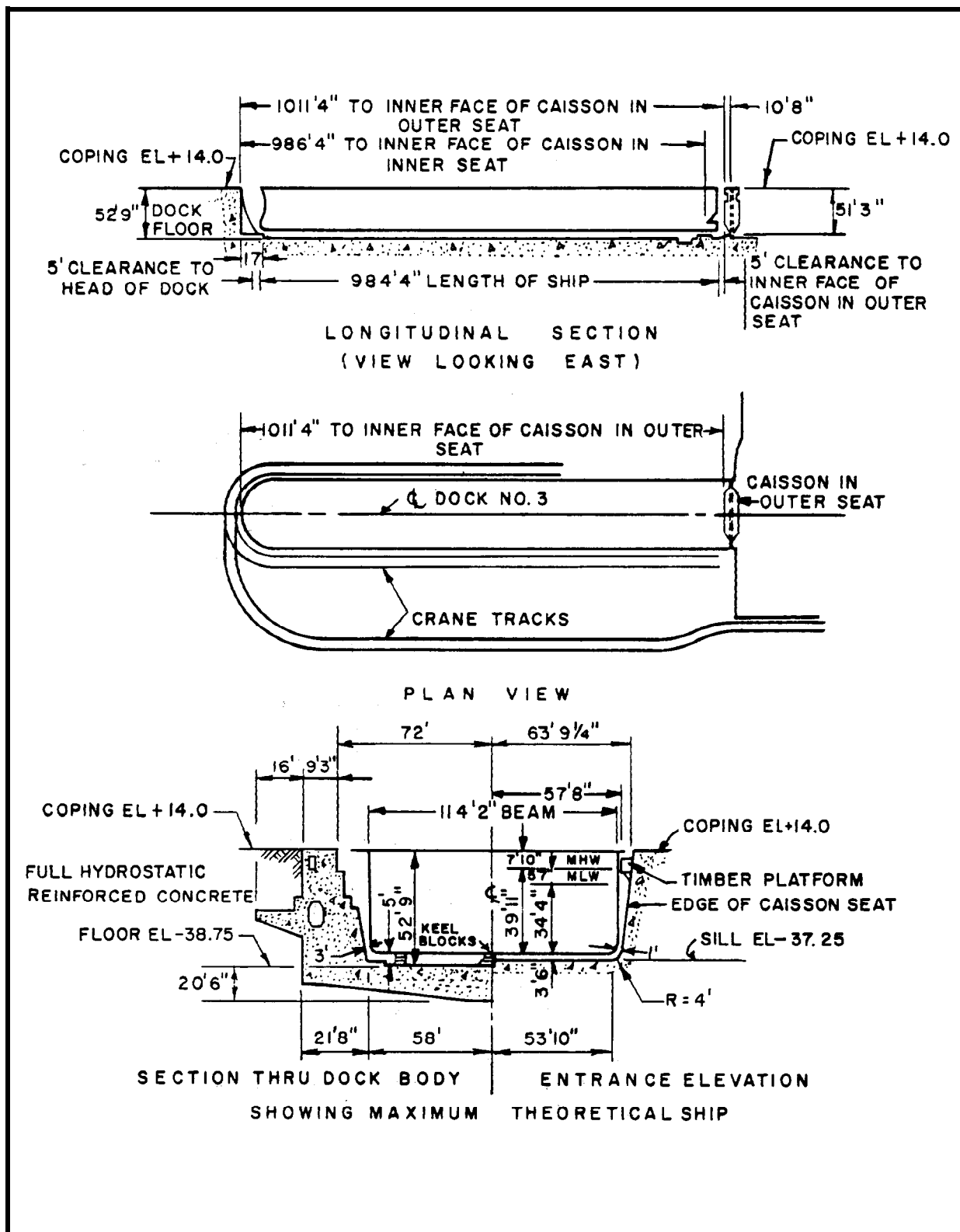


Figure 48
Philadelphia Naval Shipyard Drydock No. 3

Date Completed	Suitable for Docking	Foundation	Construction Material
1921	CVS, CG	Earth	Concrete
<div>Closure _____ Caisson, steel (hydrometer type).</div> <div>Dewatering pumps _____ Three 54", 1,250 hp, 315,000 gpm. Time to dewater: 180 min.</div> <div>Drainage pumps _____ Two 15", 150 hp, 30,000 gpm.</div> <div>Flooding _____ Through culvert. Flooding time: 60 min.</div> <div>Capstans _____ 7 total: 1 at head, 1 each side of entrance, 2 each side, 30 fpm at 30k.</div>			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main	50 lg tons	108'2"	
Auxiliary	15 lg tons	137'6"	
Whip	5 lg tons	220'0", 104'0" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	13,550	Two 4,000 amp bus west side; 23 east side and 4 west side at 400 amps.
<div>Fresh water _____ 4" and 8" mains, 1,000 gpm at 45 psi, twelve 2-1/2" outlets east side, eight 2-1/2" and four 1-1/2" outlets west side.</div> <div>River water _____ 12" mains, 7,000 gpm at 150 psi, eighteen 4 outlets each side.</div> <div>Fire protection _____ Same as river water. Three 2,500gpm at 119 psi river water booster pumps.</div> <div>Compressed air _____ 6' mains, 10,000 cfm at 100 psi, nineteen 1 -1/4" outlets. 2-1/2" headers at dock floor with outlets.</div> <div>Steam _____ 5", 6" and 8" main, 40,000 phr at 100 psi, seventeen 2" and one 1" outlets east side.</div> <div>Oxygen _____ 2-1/2' mains, 900 cfm at 120 psi, thirty-six 3/4" outlets.</div> <div>Sanitary sewer _____ 4" and 6" mains, 600 gpm, twenty 4" inlet each side.</div> <div>MAPP gas _____ 2" mains, 5 psi, sixteen 3/4" outlets east side, thirteen 3/4" outlets west side.</div>			

Figure 48 (continued)
Philadelphia Naval Shipyard Drydock No. 3

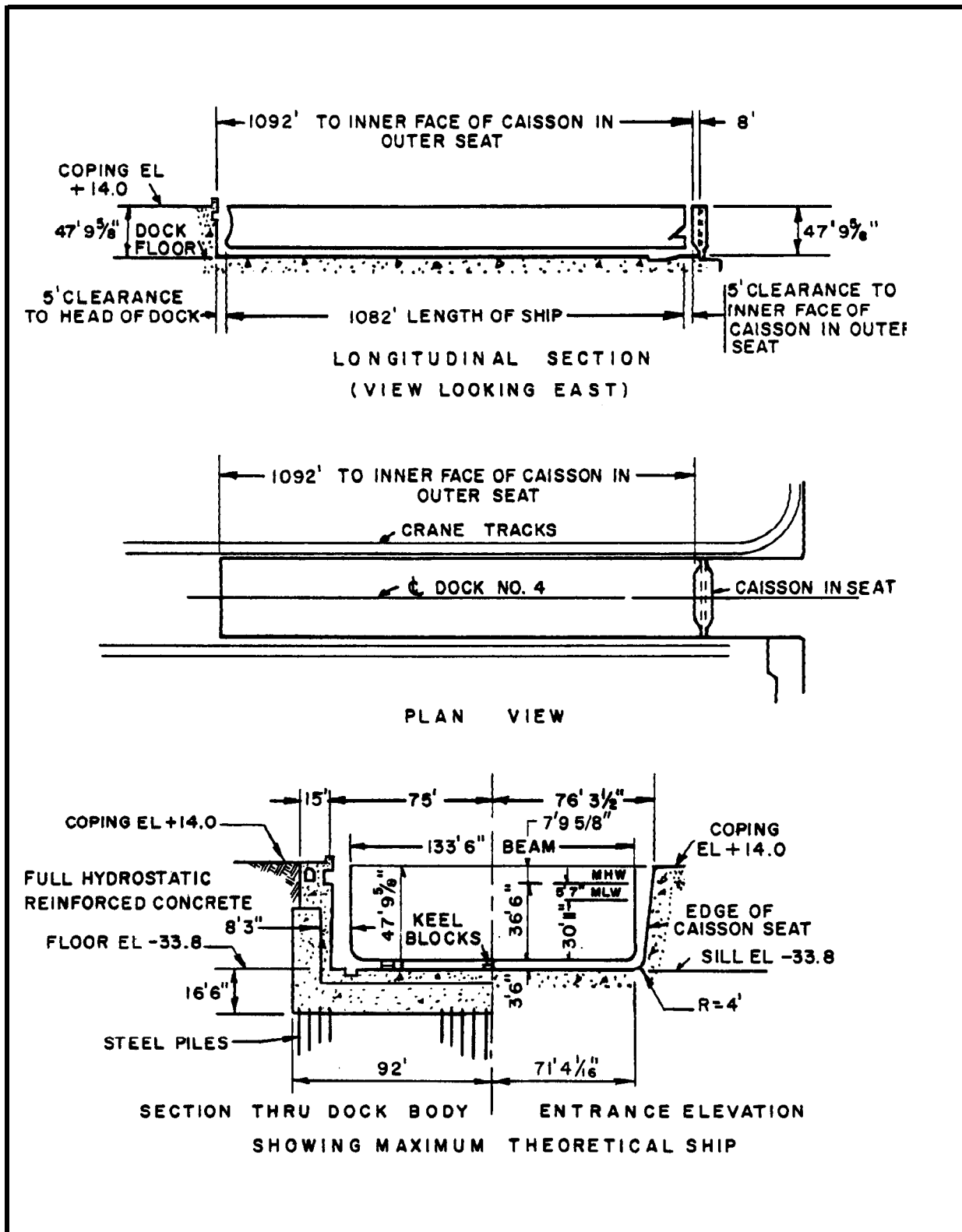


Figure 49
Philadelphia Naval Shipyard Drydock No. 4

Date Completed	Suitable for Docking	Foundation	Construction Material
1943	CV	Piles	Concrete
<div>Closure _____ Caisson, steel (rectangular box type).</div> <div>Dewatering pumps _____ Three 54", 1,200 hp, 390,000 gpm. Pumps also used for Drydock No. 5. Time to dewater 180 min.</div> <div>Drainage pumps _____ Two 16", 250 hp, 20,000 gpm. Pumps also used for Drydock No. 5.</div> <div>Flooding _____ Through culverts. Time to flood: 90 min.</div> <div>Capstans _____ 9 total: 1 at head, 1 each side of entrance, 1 each side, 30 fpm at 24k; 2 each side, 30 fpm at 12k.</div>			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main Auxiliary	75 lg tons 25 lg tons	90'0" 118'4'	
Ship and industrial Services Furnished at Dock			
Electrical	Volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	14,250	Two 4,000 amp bus west side; 17 east side and 22 west side at 400 amps.
<div>Fresh water _____ 6" mains, 800 gpm at 45 psi, twenty-four 2-1/2" outlets each side.</div> <div>River water _____ 12" mains, 7,000 gpm at 175 psi, eighteen 4" high pressure and twenty-four 2-1/2" low pressure (100 psi) outlets each side.</div> <div>Fire protection _____ Same as river water.</div> <div>Compressed air _____ 6" mains, 10,000 cfm at 100 psi, one hundred forty-four 1-1/4" outlets.</div> <div>Steam _____ 6" mains, 80,000 phr at 100 psi, forty-four 2" outlets.</div> <div>Oxygen _____ 2" and 3 mains, 800 cfm at 100 psi, thirty-six 3/4" outlets.</div> <div>Sanitary sewer _____ 8" mains, 3,200 gpm, twenty-nine 4" inlets each side.</div> <div>MAPP gas _____ 2" mains, 5 psi, twenty-two 3/4" outlets east side, nineteen 3/4" outlets west side.</div>			

Figure 49 (continued)
Philadelphia Naval Shipyard Drydock No. 4

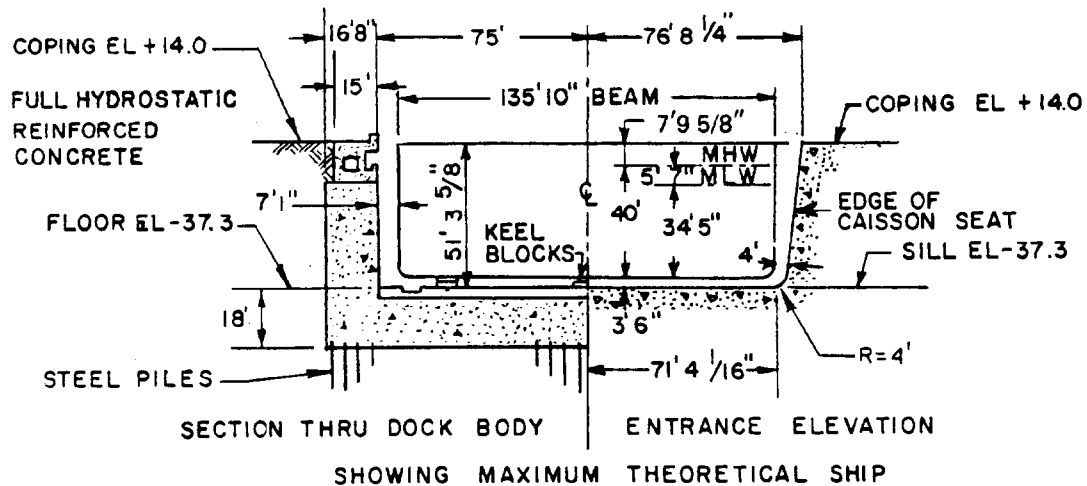
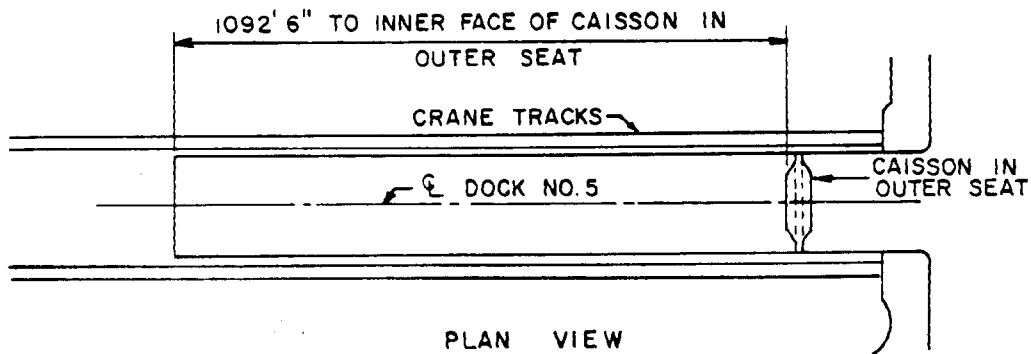
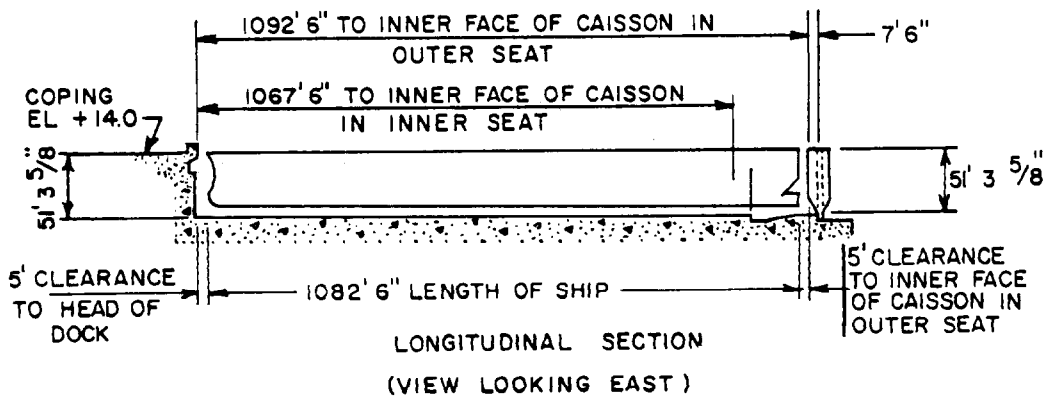


Figure 50
Philadelphia Naval Shipyard Drydock No. 5

Date Completed	Suitable for Docking	Foundation	Construction Material
1943	CV	Piles	Concrete
Closure _____	Caisson, steel (rectangular box type).		
Dewatering pumps _____	Three 54", 1,200 hp, 390,000 gpm. Pumps also used for Drydock No. 4. Time to dewater: 210 min.		
Drainage pumps _____	Two 16", 250 hp, 20,000 gpm. Pumps also used for Drydock No. 4.		
Flooding _____	Through culverts. Time to flood: 120 min.		
Capstans _____	9 total: 1 at head, 1 each side of entrance, 1 each side, 30 fpm at 24k; 2 each side, 30 fpm at 12k.		
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main	75 lg tons	90' 0"	
Auxiliary	25 lg tons	118' 4'	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	4 6 0	14,250	Two 4,000 amp bus east side; 22 east side and 17 west side at 400 amps.
Fresh water _____	6" mains, 800 gpm at 45 psi, none 2-1/2" and six 1-1/2' outlets east side, ten 2-1/2" and seven 1-1/2" outlets west side.		
River water _____	12" mains, 7,000 gpm at 175 psi, eighteen 4" high pressure and twenty-one 2-1/2" low pressure (100 psi) outlets each side.		
Fire protection _____	Same as river water.		
Compressed air _____	6" mains, 10,000 cfm at 100 PSI, one hundred 1-1/4" outlets. 4" headers at dock floor with outlets.		
Steam _____	6" mains, 80,000 phr at 100 psi, twenty-five 2-1/2" and twenty-four 2" outlets.		
Oxygen _____	2" mains, 460 cfm at 100 psi, thirty-six 3/4" outlets		
Sanitary sewer _____	8" mains, 3,200 gpm, twenty-nine 4" inlets each side.		
MAPP gas _____	2" mains, 5 psi, twenty-two 3/4" outlets each side.		

Figure 50 (continued)
Philadelphia Naval Shipyard Drydock No. 5

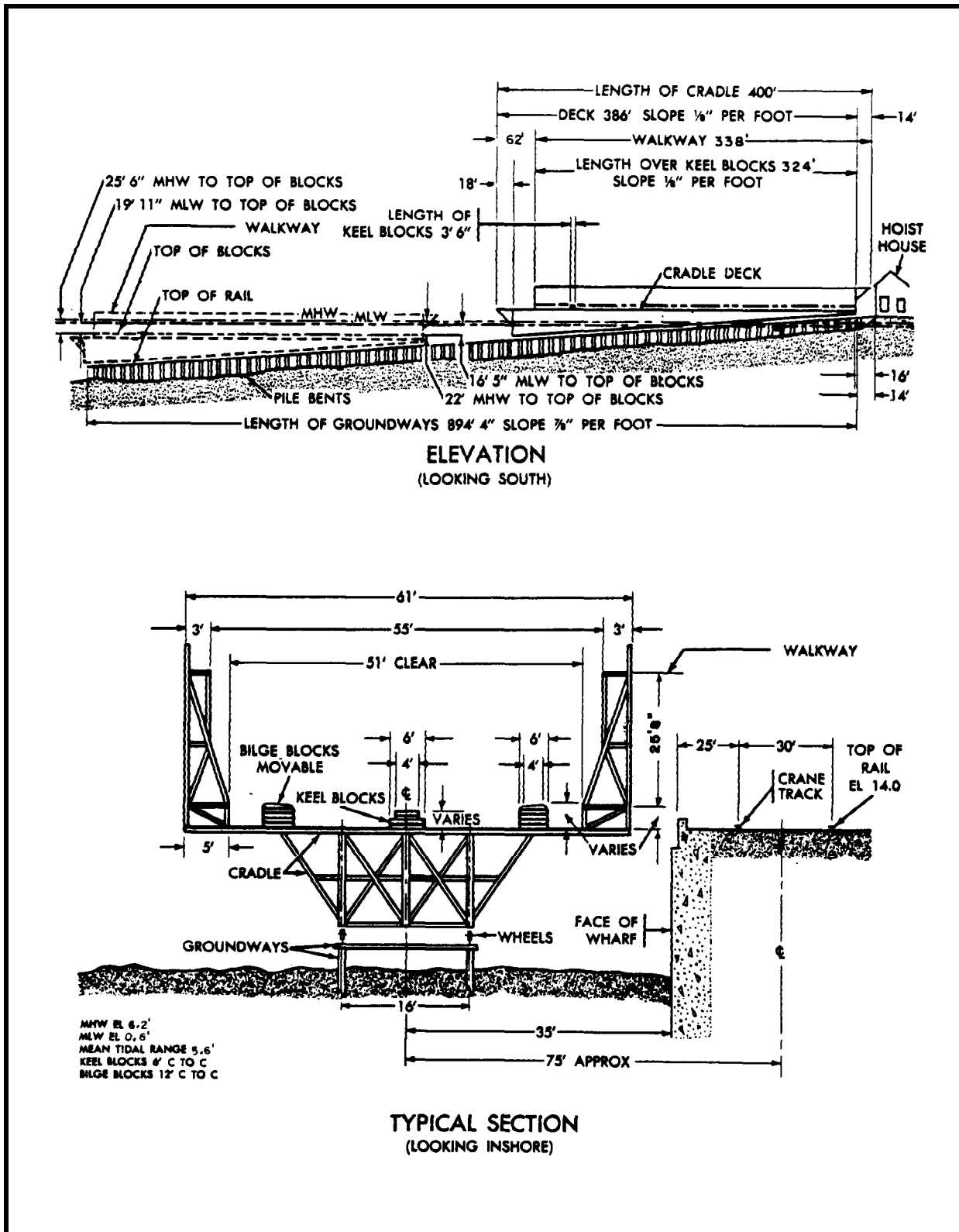
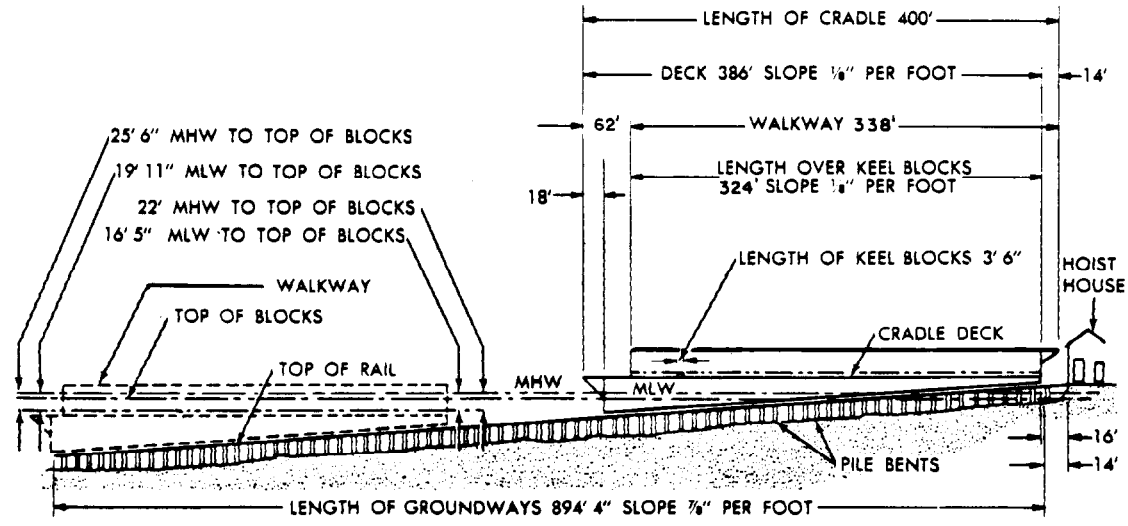


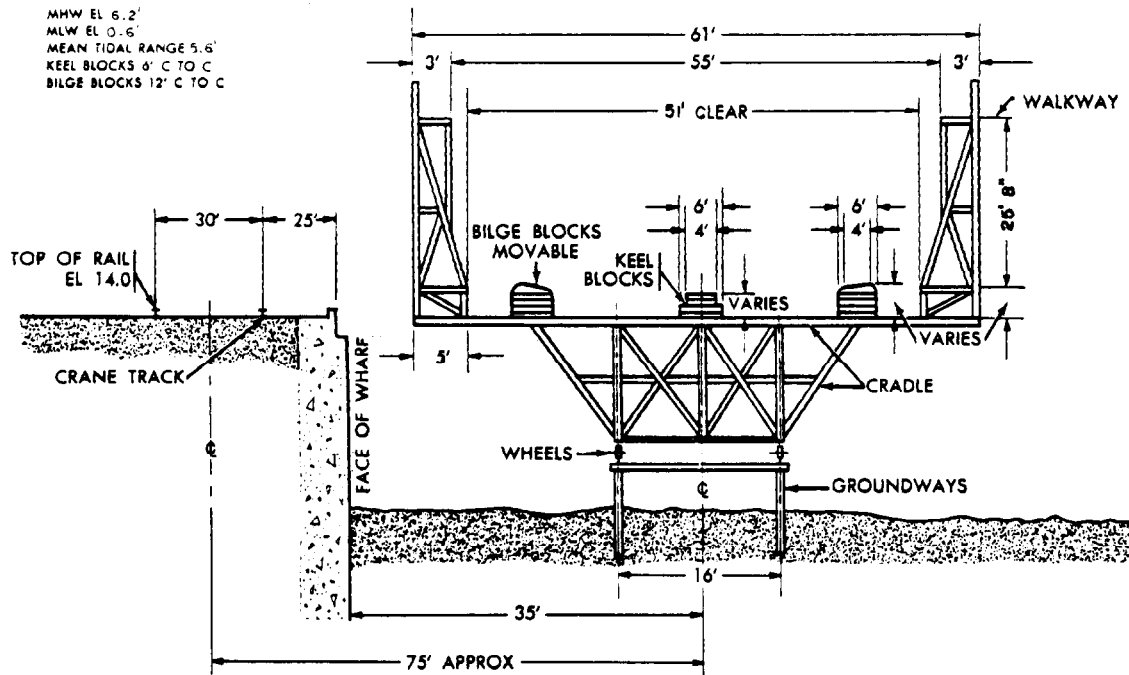
Figure 51
Philadelphia Naval Shipyard Marine Railway No. 1

Capacity _____	2,500 lg tons.
For docking _____	SS, DD, FF, and Fleet tugs.
wharf _____	On one side.
Groundway _____	Foundation- Piles and concrete.
	Construction materials- Offshore, piles and concrete.
	Inshore, concrete.
	Width of track- 16' 0".
	Number of rails-Two.
	Slope of track- 7/8" per ft.
Cradle _____	Slope at deck- 1/8" per ft.
	Slope at top of keel blocks- 1/8" per ft.
	Material- Cradle framing, steel. Superstructure framing, steel.
	Bridge at bow-Yes.
	Electric boat winch at bow-15 hp.
	Speed- Uphaul, 20 fpm; downhaul, 20 fpm.
	Wheels- 18" diameter.
Hauling mechanism _____	Motor-Electric induction, 400 hp, 2,300 v,
	3 ph, 60 hz, 50 to 300 kw.
	Chains- Uphaul, 4 chains, 2-1/4" diameter. Downhaul,
	4 chains, 1-1/6" diameter.
Electrical service _____	Ac, 3 ph, 60 hz, 460 v, 1,200 amps; Three
	400 amp receptacles on north side.
Fresh water _____	6" main, 500 gpm at 45 psi, one 3 outlet north side.
River water _____	8" main, 1,200 gpm at 55 psi, two 3" outlets north side.
Fire protection _____	Same as river water, 90 psi, four 2-1/2" and
	eight 1-1/2" outlets north side.
Compressed air _____	6" main, 5,000 cfm at 100 psi, thirteen 2-1/2" outlets north side.
Steam _____	6" main, 40,000 phr at 100 psi, one 2 outlet north side.
Oxygen _____	1-1/2" main, 150 cfm at 100 psi, five 3/4" outlets north side.
MAPP gas _____	2" main, 5 psi, seven 3/4" outlets north side.
Cranes _____	1 Portal crane, 20 t at 115 ft. rad. (hook 123' 0" above track),
	5 t at 120 ft. rad. (hook 130' 0" above track).

Figure 51 (continued)
Philadelphia Naval Shipyard Marine Railway No. 1



ELEVATION
(LOOKING SOUTH)



TYPICAL SECTION
(LOOKING INSHORE)

Figure 52
Philadelphia Naval Shipyard Marine Railway No. 2

Capacity _____	2,500 lg tons.
For docking _____	SS, DD, FF, and Fleet tugs.
Wharf _____	On one side.
Groundway _____	Foundation- Piles and concrete. Construction materials-Offshore, piles and concrete. Inshore, concrete.
	Width of track- 16'0".
	Number of rails-Two.
	Slope of track- 7/8" per ft.
Cradle _____	Slope of deck- 1/8" per ft.
	Slope at top of keel blocks- 1/8" per ft.
	Material- Cradle framing, steel. Superstructure framing, steel.
	Bridge at bow- Yes.
	Electric boat winch at bow-15 hp.
	Speed- Uphaul, 20 fpm: downhaul, 20 fpm.
	Wheels- 18" diameter.
Hauling mechanism _____	Motor-Electric induction, 400 hp, 2,300 v, 3 ph, 60 hz, 50 to 300 kw.
	Chains- Uphaul, 4 chains, 2-1/4" diameter. Downhaul, 4 chains, 1-1/8" diameter.
Electrical service _____	Ac, 3 ph, 60 hz, 460 v, 1,200 amps: Three 400 amp receptacles on south side.
Fresh water _____	6" main, 500 gpm at 45 psi, one 3 outlet south side.
River water _____	8" main, 1,200 gpm at 55 psi, two 3" outlets south side.
Fire protection _____	Same as river water, 90 psi, six 2-1/2" outlets south side,
Compressed air _____	6" main, 5,000 cfm at 100 psi, thirteen 2-1/2" outlets south side.
Steam _____	6" main, 40,000 phr at 100 psi, nine 3/4" outlets south side.
Oxygen _____	2-1/2" main, 450 cfm at 100 psi, nine 3/4" outlets south side.
MAPP gas _____	2 main, 5 psi, nine 3/4" outlets south side.
Cranes _____	2 Portal cranes, 15 t at 85 ft. rad. (hook 44'0" above track), 5 t at 105 ft. rad. (hook 52'0" above track).

Figure 52 (continued)
Philadelphia Naval Shipyard Marine Railway No. 2

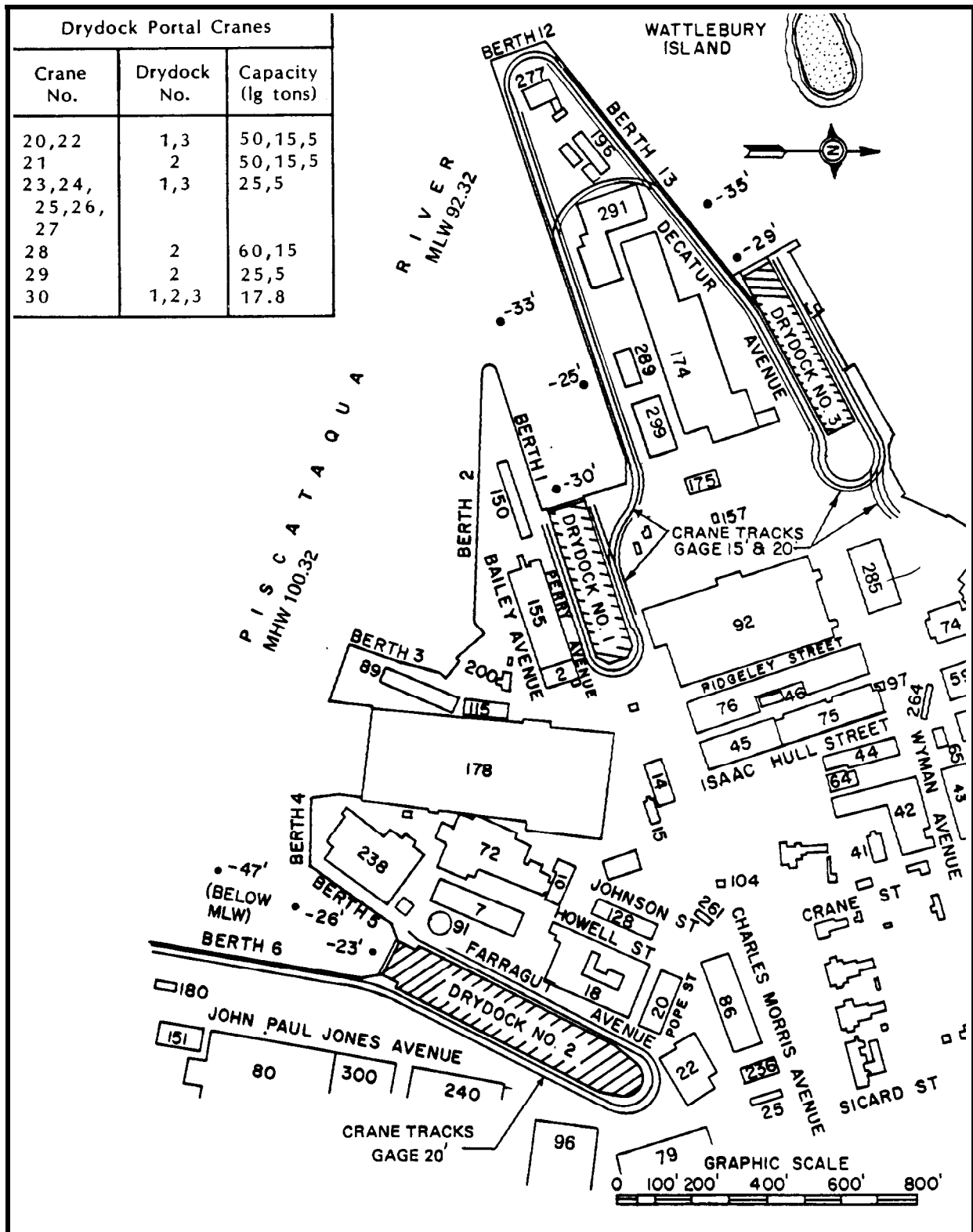


Figure 53
Location of Drydocks, Portsmouth Naval Shipyard, Portsmouth, New Hampshire

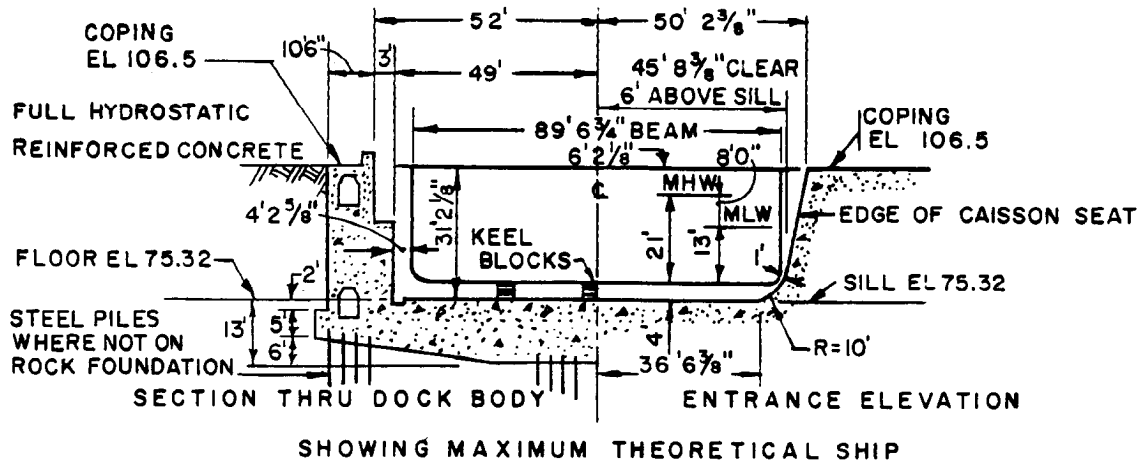
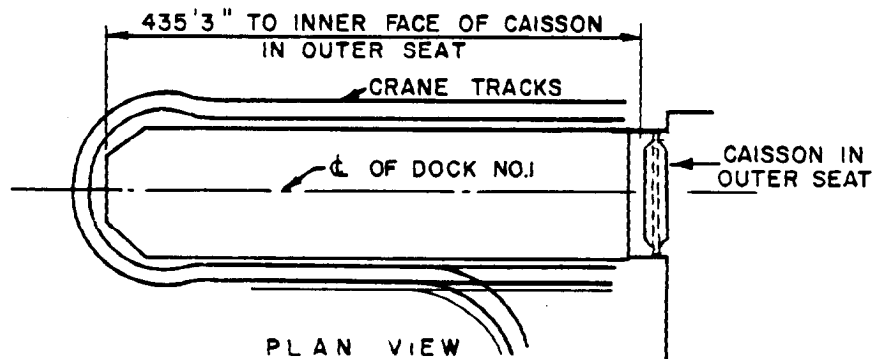
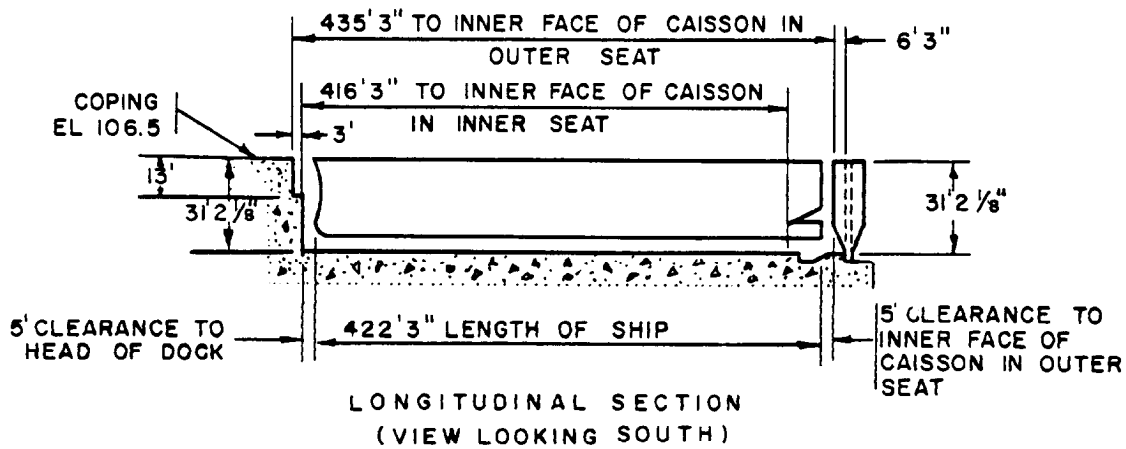


Figure 54
Portsmouth Naval Shipyard Drydock No. 1

Date Completed	Suitable for Docking	Foundation	Construction Material
1942	SSN	Rock or piles	Concrete
<div>Closure _____ Caisson, steel (rectangular box type).</div> <div>Dewatering pumps _____ Two 48", 350 hp, 146,000 gpm. Time to dewater 75 min.</div> <div>Drainage pumps _____ TWO 16", 150 hp, 14,000 gpm.</div> <div>Flooding _____ Through culverts. Time to flood: 75 min.</div> <div>Capstans _____ 6 total: 1 at head, 30 fpm at 24; 1 each side of entrance, 1 each side, 1 at east end of Berth II, 30 fpm at 12k.</div>			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main	50 lg tons	118'6"	
Auxiliary	15 lg tons	145'10"	
Whip	5 lg tons	144'7", 65'6" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	1,400	3 north side and 5 south side at 400 amps
Ac, 3 Ph, 60 Hz	460	1,200	3 south side at 400 amps.
Dc	375	3,500	2 north side and 4 south side at 1,000 amps
<div>Fresh water _____ 4" mains, 400 gpm at 65 psi, three 2" outlets each side. 4' headers at dock floor with outlets.</div> <div>Salt water _____ 6 mains, 1,000gpmat100 psi, two 2-1/2" outlets each side. 4" headers at dock floor with outlets.</div> <div>Fire protection _____ Same as saltwater.</div> <div>Compressed air _____ 6" mains, 100 psi, three 2" outlets each side. 4" headers at dock floor with outlets.</div> <div>Low pressure _____ 3" south and 4" north side mains, 4,250 phr at 100 steam psi, three 4" outlets north side, three 1-1 /2' outlets south side. 4" headers at dock floor with outlets.</div> <div>High pres. steam _____ 8" main, 600 psi, one 6" outlet north side.</div> <div>Oxygen _____ 1-1/2"mains, 110 psi, three 3/4" outlets each side.</div> <div>Sanitary sewer _____ 4" south side main, 200 gpm, one 4" inlet.</div> <div>MAPP gas _____ 1-1 /2" mains, 15 psi, three 3/4" outlets each side.</div>			

Figure 54 (continued)
Portsmouth Naval Shipyard Drydock No. 1

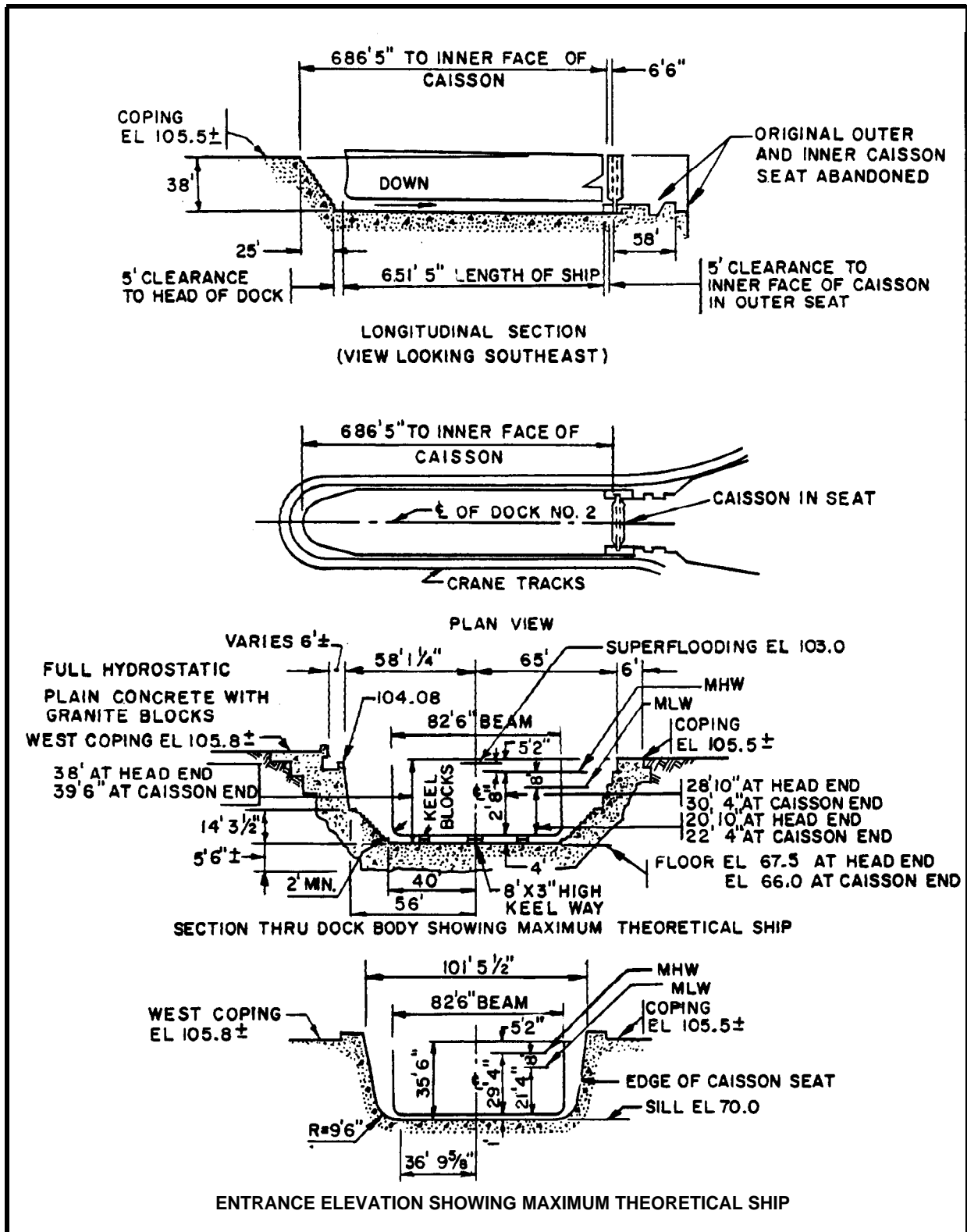


Figure 55
Portsmouth Naval Shipyard Drydock No. 2

Date Completed	Suitable for Docking	Foundation	Construction
1905	SSBN	Rock	Concrete and granite
<div>Closure _____ Caisson, steel (rectangular box type).</div> <div>Dewatering pumps_____ Three 45",600 hp, 210,000 gpm.</div> <div>Time to dewater: 150 min.</div> <div>Drainage pumps _____ Two 14",75 hp, 10,000 gpm.</div> <div>flooding _____ Through caisson. Time to flood: 75 min. Superflooding</div> <div>pumps: two 30:, 125 hp, 20,000 gpm</div> <div>Capstans _____ 8 total: 4 each side, 30 fpm at 24k. 3 winches: 1 at</div> <div>head, 1 each side of entrance, 15 fpm at 20k.</div>			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond lock centering	Max height above coping with hook at dock centerline	
Main	44,6 lg tons	109'10	
Auxiliary	15 lg tons	136' 6"	
Whip	5 lg tons	137'3", 65'6" min radius	
Ship and industrial Services Furnished at Dock			
Electrical	Volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	3,200	2 west side at 1,600 amps
Ac, 3 Ph, 60 Hz	460	3,200	4 each side at 400 amps,
Ac, 3 Ph, 60 Hz	460	2,400	6 west side at 400 amps.
Dc	375	2,040	4 west side at 1,020 amps.
<div>Fresh water _____ 12" west and 16" east side mains, 65 psi, eight 2-1/2</div> <div>outlets east side, twelve 2-1/2" outlets west side.</div> <div>2" and 4" headers at dock floor with outlets.</div> <div>Fire protection _____ Same as freshwater.</div> <div>Low pressure air _____ 6" mains, 100 psi, three 3 and one 2" outlets east side, four 3"</div> <div>outlets west side. 2" and 4" headers at dock floor with outlets.</div> <div>High pressure air _____ Two 1" west side mains, 4,500 psi, six 1" outlets.</div> <div>Low pressure steam_____ 4" mains, 7,400 phr at 100 psi, one 4" outlet east side, four 3" outlets</div> <div>west side. 2" and 4" headers at dock floor with outlets.</div> <div>High pres. steam _____ 6" main, 600 psi, three 6 outlets west side.</div> <div>Oxygen _____ 2" mains, 110 psi, four 1" outlets each side.</div> <div>Sanitary sewer _____ 4" east side main, 200 gpm, five 4" inlets.</div> <div>MAPP gas _____ 2" mains, 15 psi, four 1" outlets each side.</div>			

Figure 55 (continued)
Portsmouth Naval Shipyard Drydock No. 2

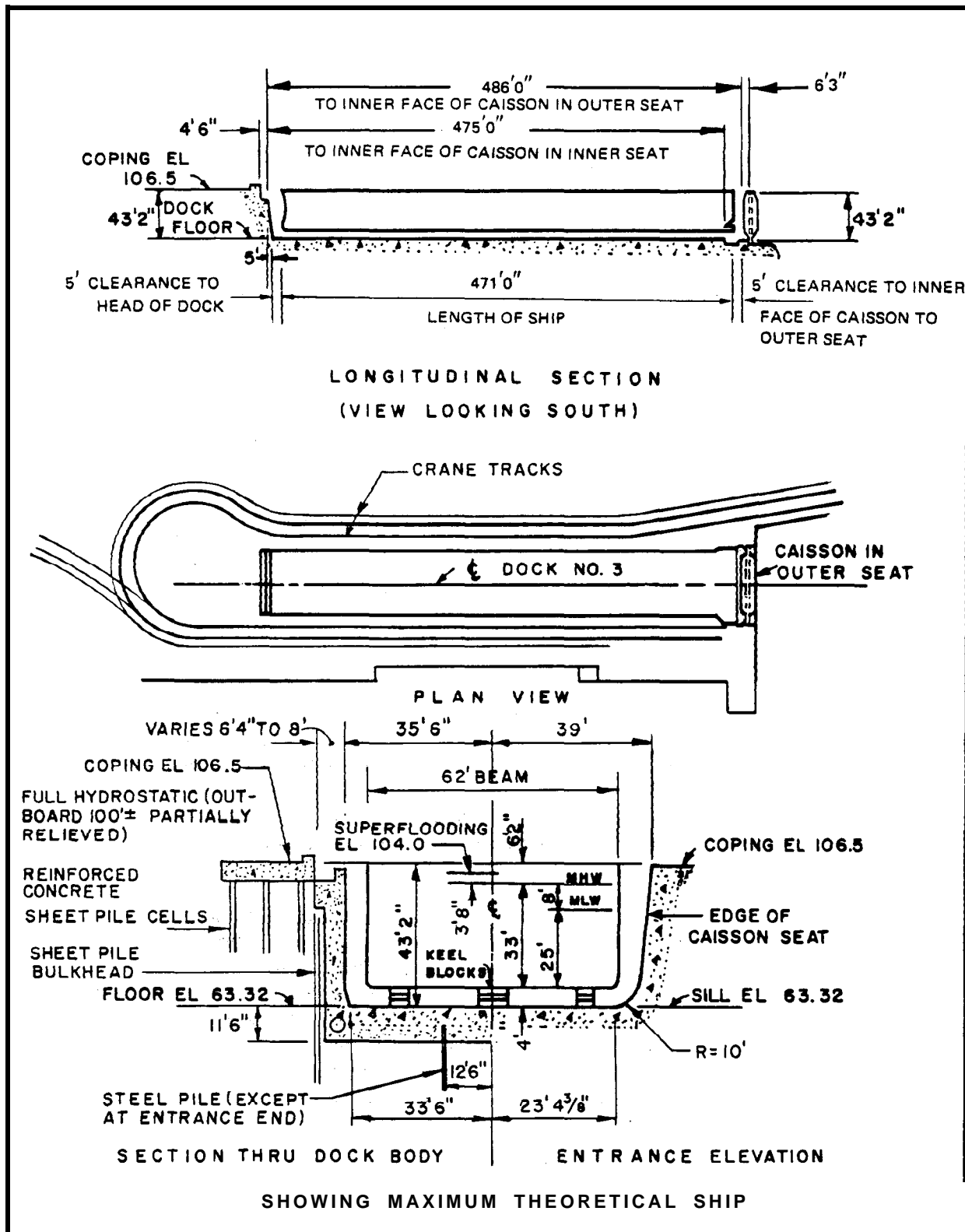


Figure 56
Portsmouth Naval Shipyard Drydock No. 3

Date Completed	Suitable for Docking	Foundation	Construction Material
1962	SSBN	Rock or piles	Concrete
<p>Closure _____ Caisson, steel (rectangular box type).</p> <p>Dewatering pumps _____ Two 36", 300 hp, 60,000 gpm. Time to dewater: 185 min.</p> <p>Drainage pumps _____ Two 8", 40 hp, 3,000 gpm.</p> <p>Flooding _____ Through culverts. Time to flood: 120 min. Superflooding pumps: two 24", 50 hp, 20,000 gpm.</p> <p>Capstans _____ 5 total: 1 at head, 30 fpm at 24k; 1 south side of entrance, 1 north side and 2 south side, 30 fpm at 12k. 1 winch; north side of entrance, 30 fpm at 12k.</p>			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main	50 lg tons	124'6"	
Auxiliary	15 lg tons	148'11"	
whip	5 lg tons	144'10", 65'6" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	8,400	1 north at 2200A; 1 south at 4000A.
Ac, 3 Ph, 60 Hz	460	3,000	2 north, 6 south at 400A; 1 north at 800A.
Dc	375	4,000	2 south at 2,000A.
<p>Fresh water _____ 4" south and 6' north side mains, 400 gpm at 65 psi, five 2-1/2" outlets north side, ten 2-1/2" outlets south side. 4" headers at dock floor with outlets.</p> <p>Pure water _____ Two 1-1/2" south side mains, 60 psi, twelve outlets.</p> <p>Salt water _____ 6" and 8" main, 2,500 gpm at 90 psi, ten 2-1/2" outlets north side. 4" headers at dock floor with outlets.</p> <p>Fire protection _____ Same as saltwater and fresh water.</p> <p>Low pressure air _____ 4" north and 6" south side mains, 100 psi, nine 2" outlets north side, seven 2-1/2" and two 2" outlets south side. 4" headers at dock floor with outlets.</p> <p>High pressure air _____ 1" main, 4,500 psi, four 1/2" outlets south side.</p> <p>Low pressure steam _____ 2" north and 6' south side mains, 7,400 phr at 100 psi, ten 1-1/2" outlets north side, one 4", eight 2-1/2" and one 1-1/2" outlets south side.</p> <p>High pres. steam _____ 6" main, 600 psi, one 6" outlet south side.</p> <p>Oxygen _____ 1-1/2" mains, 110 psi, five 3/4" outlets each side.</p> <p>Sanitary sewer _____ 4" south side main, 200 gpm, one 4" inlet.</p> <p>MAPP gaS _____ 1-1/2" mains, 15 psi, five 3/4" outlets each side.</p>			

Figure 56 (continued)
Portsmouth Naval Shipyard Drydock No. 3

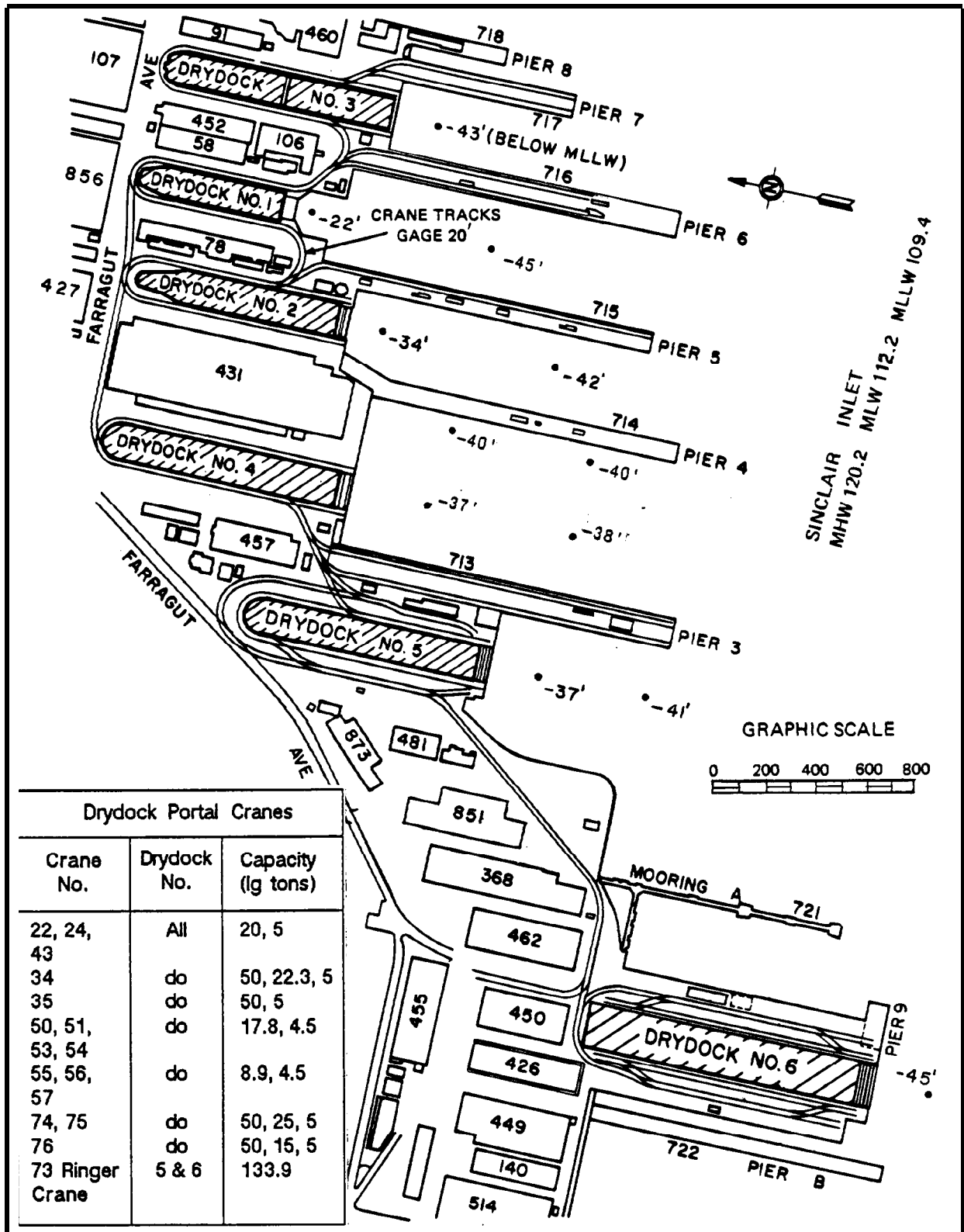


Figure 57
Location of Drydocks, Puget Sound Naval Shipyard, Bremerton, Washington

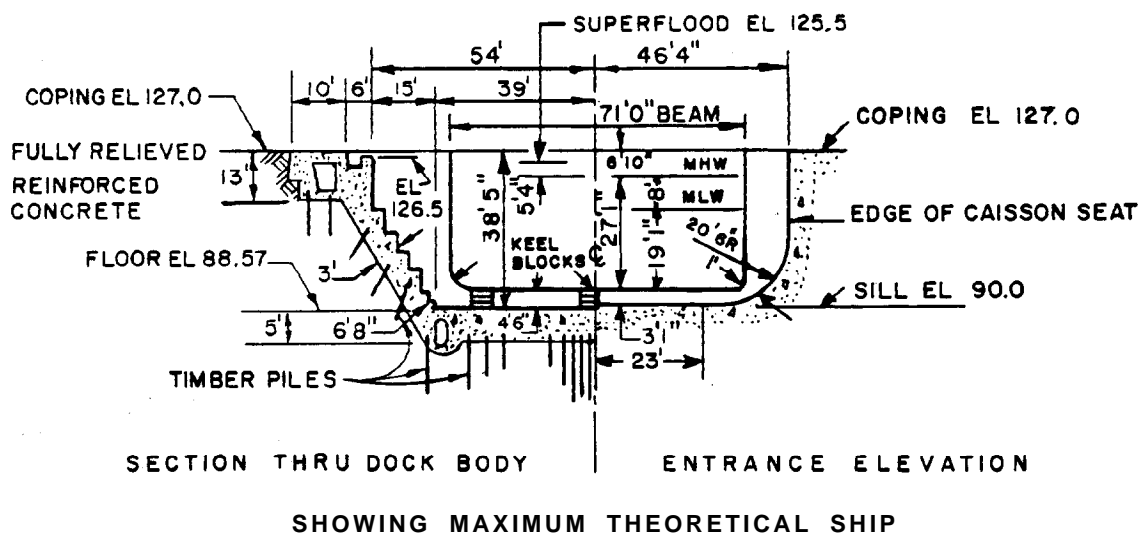
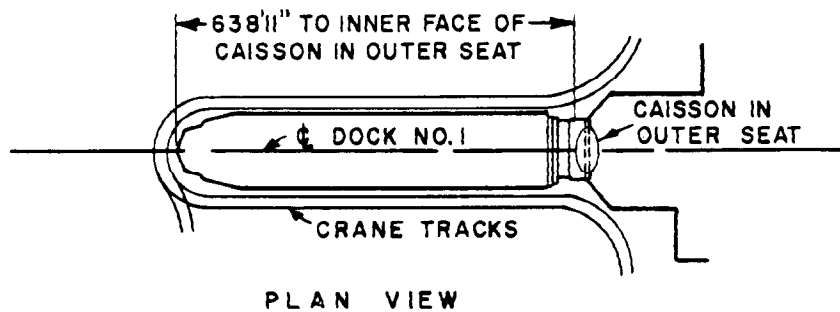
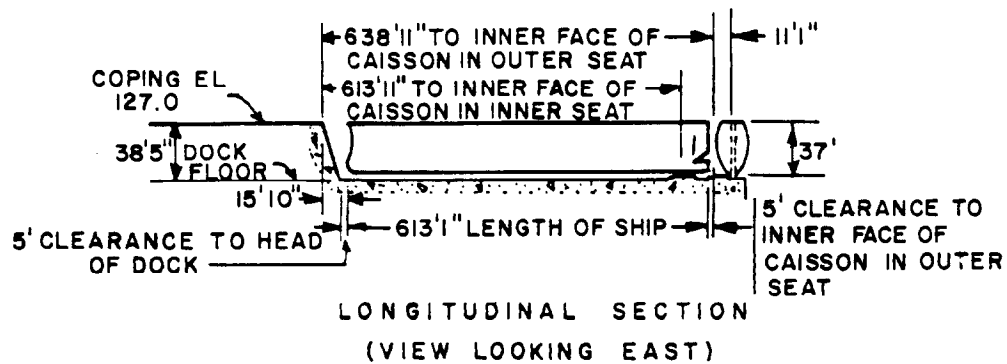


Figure 58
Puget Sound Naval Shipyard Drydock No. 1

Date Completed	Suitable for Docking	Foundation	Construction Material
1931	SSN, SSBN	Piles	Concrete
Item	Data		
Closure _____	Caisson, steel (ship type).		
Dewatering pumps_	Four 54", 550 hp, 320,000 gpm total (Drydock No. 2 pumphouse). Time to dewater: 90 min.		
Drainage pumps —	Two 15“, 85 hp, 9,750 gpm total (Drydock No. 2 pumphouse). Drydock No. 4 or 5 drainage pumps normally used.		
Flooding _____	Through caisson. Time to flood: 105 min. Superflooding pumps: two 36“, 75 hp, 30,000 gpm.		
Capstans _____	6 total: 1 at head, 1 each side of entrance, 1 east side. 1 west side, 30 fpm at 12k; 1 west side, 30 fpm at 24k.		
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main Auxiliary whip	50 lg tons 25 lg tons 5 lg tons	118'9" 166'8", 86'0" min radius 220' 0“, 108'3“ min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	4,800	2 west side at 2,400 amps.
Ac, 3 Ph, 60 Hz	460	1,600	1 west side at 1,600 amps.
Ac, 3 Ph, 60 Hz	460	1,200	2 west side at 1,200 amps.
Item	Data		
Fresh water _____	6" mains, 1,000 gpm at 80 psi, eight 2-1/2" outlets and one 4“ outlet each side.		
Pure water _____	1-1/2" main, 50 gpm at 62 psi, two 1-1/2" outlets west side.		
Salt water _____	8" east and 12” west side mains, 4,200 gpm at 100 psi, sixteen 4" outlets each side, eight 2-1/2 outlets each side.		
Fire protection _____	Same as salt water.		
Compressed air _____	10", 6", and 3-1/2" mains, 4,000 cfm at 80 psi, eight 2" outlets each side. 2“ headers at dock floor with outlets.		
Steam _____	2-1/2” east, 2-1/2” and 3" west side mains, 20,000 phr at 80 psi, eight 2’ outlets each side.		
Oxygen _____	2" mains, 1,100 cfm at 100 psi, seven 1" outlets each side.		
Sanitary sewer _____	8" mains, 300 gpm, ten 4" inlets each side.		

Figure 58 (continued)
Puget Sound Naval Shipyard Drydock No. 1

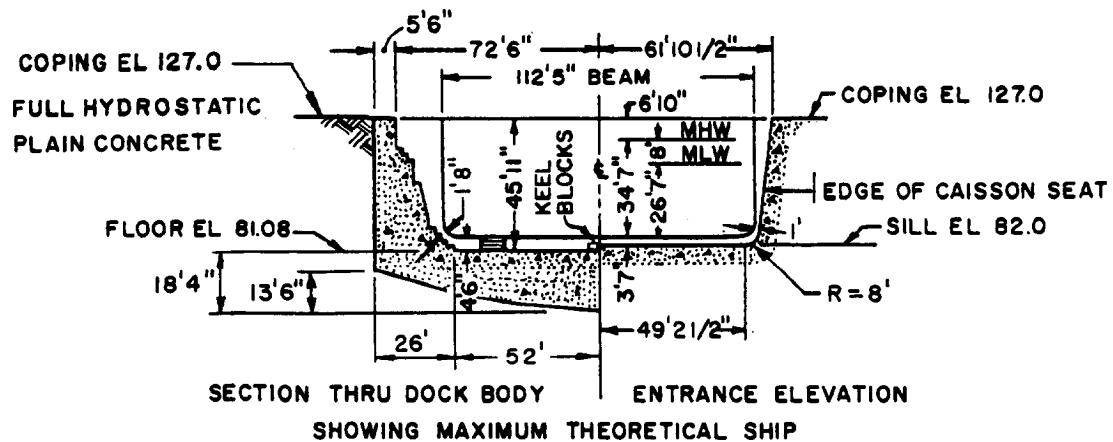
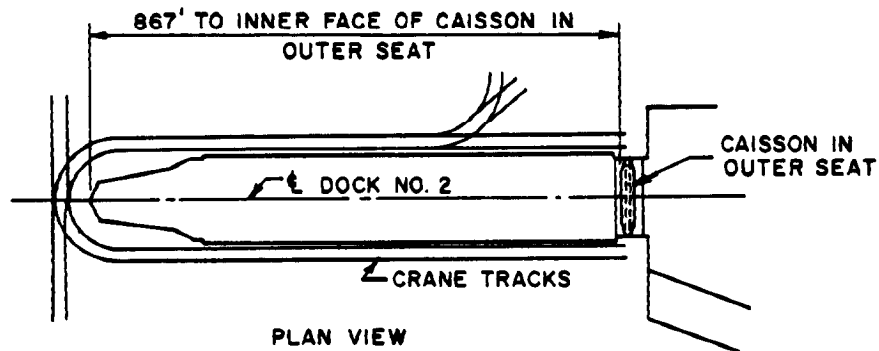
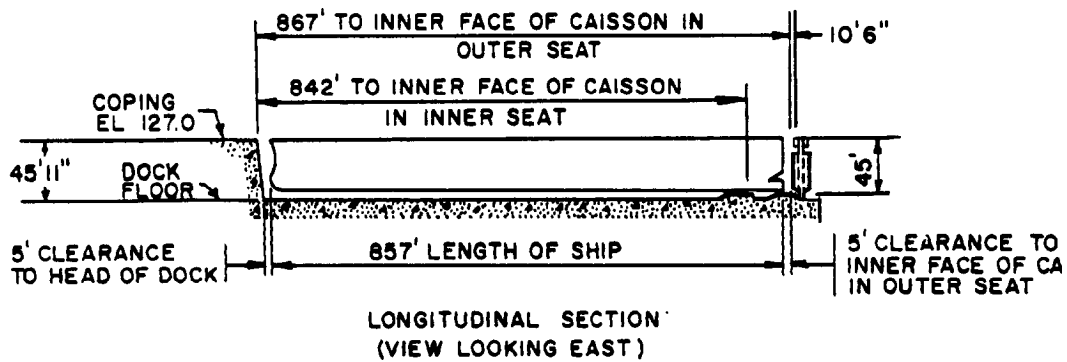


Figure 59
Puget Sound Naval Shipyard Drydock No. 2

Date Completed	Suitable for Docking	Foundation	Construction Material
1911	CVA, CVS, SSBN	Earth	Granite and Concrete
Item	Data		
Closure _____ Caisson, steel (hydrometer type). DeWatering pumps_____ Four 54", 550 hp, 320,000 gpm total, Pumps also used for Drydock No. 1 and 3. Time to dewater: 165 min. Drainage pumps _____ Two 15", 85 hp, 9,750 gpm total (Drydock No. 2 pumphouse). Drydock No. 4 or 5 drainage pumps normally used. Flooding _____ Through caisson. Time to flood: 75 min. Capstans _____ 8 total: 1 at head, 12 fpm at 35k; 1 each side of entrance, 3 east side, 2 west side, 12 fpm at 17k.			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main Auxiliary Whip	50 lg tons 25 lg tons 5 lg tons	115' 0" 166' 8", 86' 0" min radius 220' 0", 108' 3" min radius	
Ship and industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz Ac, 3 Ph, 60 Hz Ac, 3 Ph, 60 HZ	460 460 460	4,800 2,400 1,800	2 west side at 2,400 amps, 1 west side at 2,400 amps. 2 east side at 1,800 amps.
item	Data		
Fresh water _____ 8" mains, 3,000 gpm at 80 psi, sixteen 2-1/2" outlets each side. Pure water _____ 1-1/2" main, 50 gpm at 55 psi, one 1-1/2" outlet west side. Salt water _____ 12" mains, 4,200 gpm at 100 psi, twenty-four 4 outlets each side. Fire protection _____ Same as salt water, plus two 2-1/2" outlets each side. Compressed air _____ 4" and 6" east and 6" west side mains, 9,000 cfm at 80 psi, two 2', six 1-1/2' and three 1-1/4" outlets east side, twenty-four 1-1/2" outlets west side. 2" headers at dock floor with outlets. Steam _____ 6 mains, 30,000 phr at 80 psi, eleven 2" outlets each side, one 1-1/2" and one 3/4" outlet west side. Oxygen _____ 2-1/2" mains, 1,300 cfm at 100 psi, six 1" outlets each side. Sanitary sewer _____ 8" mains, 300 gpm, thirty-five 6" inlets each side.			

Figure 59 (continued)
Puget Sound Naval Shipyard Drydock No. 2

Date Completed	Suitable for Docking	Foundation	Construction Material
1919	DD, SS	Earth	Concrete
Item	Data		
Closure _____	Caisson, steel (hydrometer type). Removable intermediate bulkhead, steel and timber.		
Dewatering pumps _____	Four 54", 550 hp, 320,000 gpm total. (Dock No. 2 pumphouse). Time to dewater: 90 min. south section; 165 rein, total.		
Drainage pumps _____	Two 8", 50 hp, 4,000 gpm total. (Pumphouse 3A-North); two 14", 75 hp, 9,000 gpm total. (Pumphouse 3-South). Drydock No. 4 or 5 drainage pumps normally used.		
Flooding _____	Through culverts. Time to flood: 60 rein, south section; 120 rein, total dock.		
Capstans _____	4 total: 1 each side of entrance, 1 each side, 30 fpm at 12k.		
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main Auxiliary Whip	50 lg tons 25 lg tons 5 lg tons	116'9" 166' 8", 86'0" min radius 220'0", 108'3" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	Volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	1,200	2 east side at 600 amps.
Ac, 3 Ph, 60 Hz	460	800	2 west side at 800 amps.
Ac, 3 Ph, 60 Hz	460	1,200	3 east side at 400 amps.
		400	1 west side at 400 amps.
Item	Data		
Fresh water _____	6" west and 4" east side mains, 1,200 gpm at 80 psi, nine 2-1/2" outlets each side.		
Salt water _____	10" mains, 4,200 gpm at 100 psi, eighteen 2-1/2" outlets east side, thirty-six 4 outlets west side.		
Fire protection _____	Same as salt water.		
Compressed air _____	6" west, 8" and 6" east side mains, 10,000 cfm at 80 psi, nine 4 outlets each side. 4" headers at dock floor with outlets.		
Steam _____	3" main, 18,000 phr at 80 psi, five 2" outlets west side.		
Oxygen _____	2" mains, 1,100 cfm at 100 psi, nine 1" outlets each side.		
Sanitary sewer _____	6" mains north section, nine 6" inlets each side; 6" mains south section, twelve 6" inlets east side and twenty-four 6" inlets west side; 400 gpm		

Figure 60 (continued)
Puget Sound Naval Shipyard Drydock No. 3

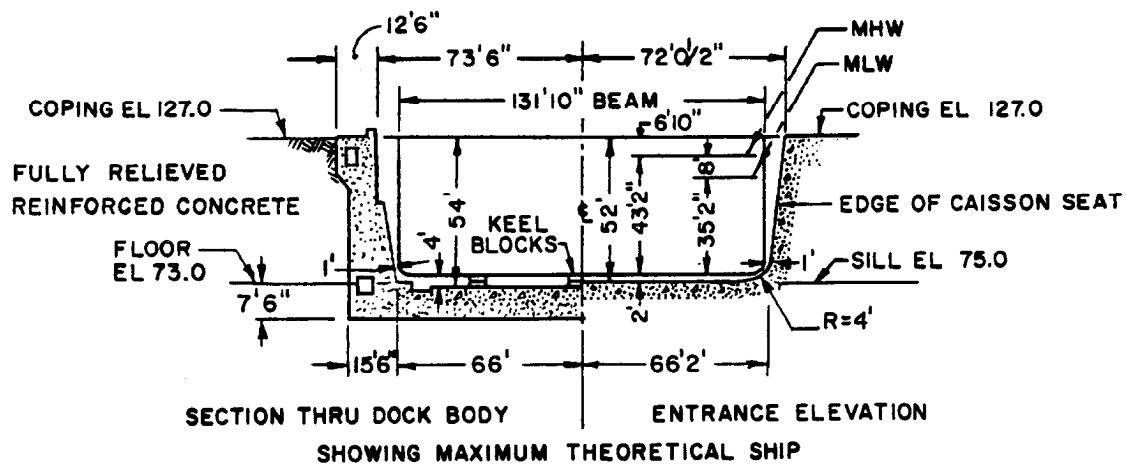
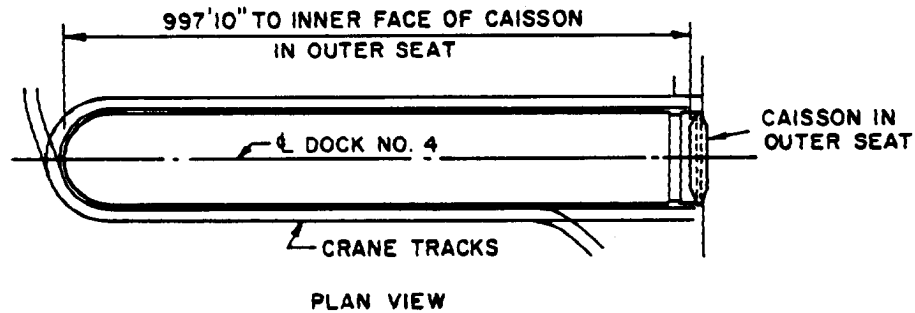
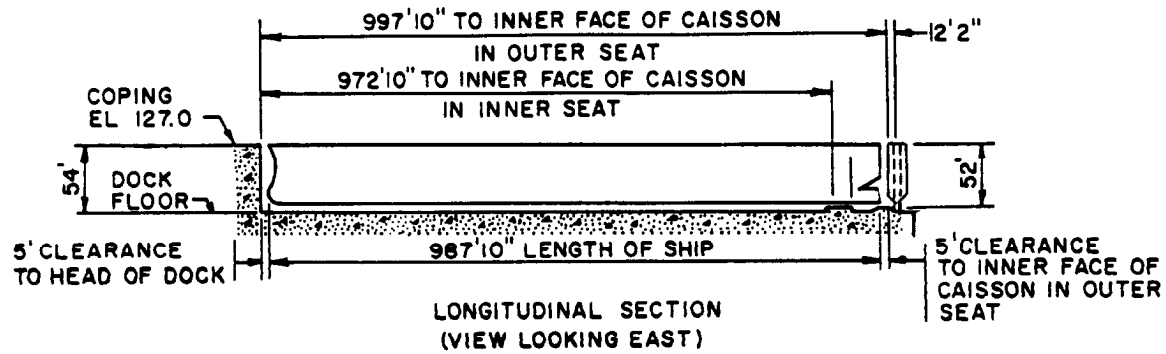


Figure 61
Puget Sound Naval Shipyard Drydock No. 4

Date completed	Suitable for Docking	Foundation	Construction Material
1940	CV	Earth	Concrete
Item	Data		
Closure _____ Caisson, steel (rectangular type). Spare caisson, steel (rectangular box type), also used for Drydock No. 5.			
Dewatering pumps_____ Three 54", 1,200 hp, 390,000 gpm total. Time to dewater 195 min.			
Drainage pumps_____ Two 16", 250 hp, 14,400 gpm total.			
Flooding _____ Through culvert and caisson. Time to flood: 90 min. using caisson No. 4. When using caisson No. 5 or spare caisson, flooding through culvert only time to flood: 300 to 420 min. depending on tide.			
Capstans _____ 13 total: 1 at head, 1 each side of entrance, 30 fpm at 24k; 2 each side, 10 fpm at 50k; 4 each side, 30 fpm at 12k.			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main	50 lg tons	113'6"	
Auxiliary	25 lg tons	165'9"	
Whip	5 lg tons	220'0", 108'3" min radius	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	4,800	2 east side at 2,400 amps.
Ac, 3 Ph, 60 Hz	460	2,400	2 east side at 2,000 amps; 2 east side at 1,200 amps; 1 east side at 800 amps; 1 east side at 400 amps.
Item	Data		
Fresh water _____ 6" east and 8" west side mains, 2,200 gpm at 80 psi, ten 2-1/2" outlets each side.			
Pure water _____ 3" main, 50 gpm at 84 psi, one 1-1/2" outlets west side.			
Salt water _____ 12" main, 7,000 gpm at 100 psi, twenty-four 4" outlets each side.			
Fire protection _____ Same as salt water, plus four 2-1/2' outlets east side.			
Compressed air _____ 6" mains, 8,000 cfm at 80 psi, twenty-four 1-1/4' outlets each side. 2-1/2" headers at dock floor with outlets.			
Steam _____ 6" east and 8' west side mains, 50,000 phr at 60 psi, twelve 2-1/2" outlets each side.			
Oxygen _____ 2" east and 3" west side mains, 1,350 cfm at 100 psi, six 1" outlets each side.			
Sanitary sewer _____ 8" mains, 400 gpm, eighteen 6" & twelve 4" inlets each side.			

Figure 61 (continued)
Puget Sound Naval Shipyard Drydock No. 4

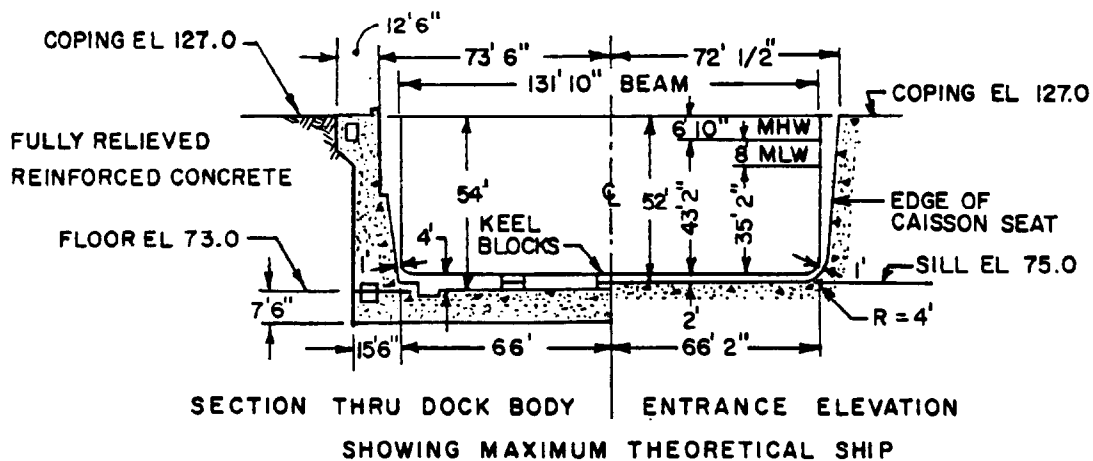
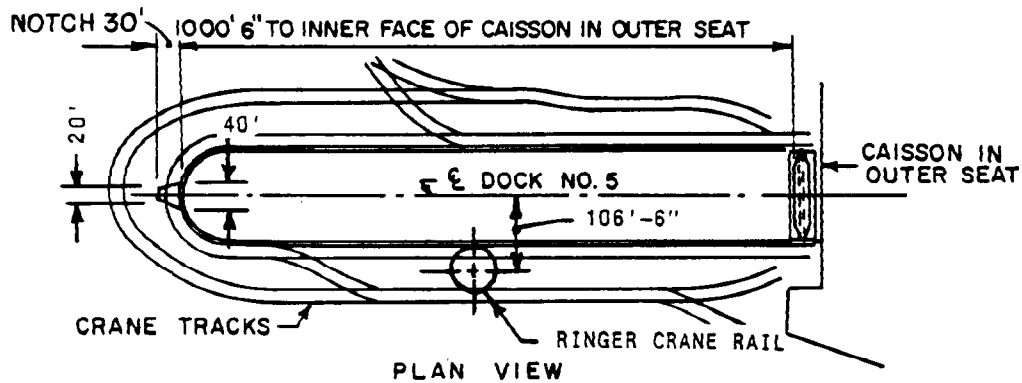
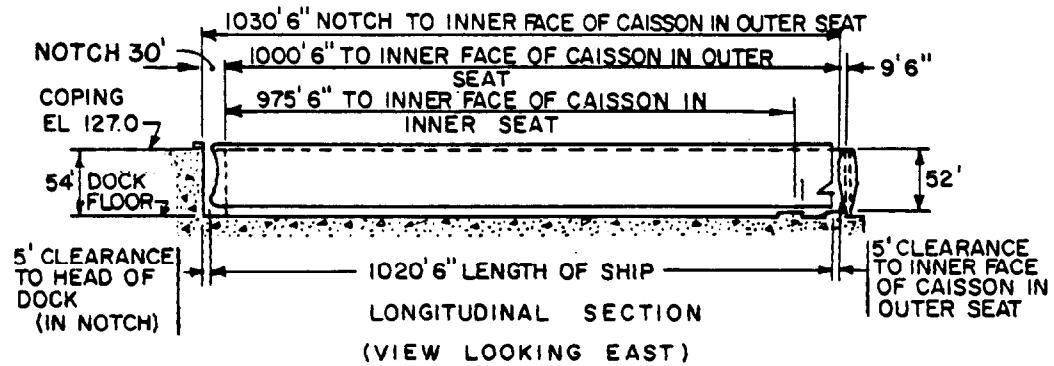


Figure 62
Puget Sound Naval Shipyard Drydock No. 5

Date completed	Suitable for Docking	Foundation	Construction Material
1941	CGN, SSBN	Earth	Concrete
Item	Data		
Closure _____	Caisson, steel (rectangular box type). Spare caisson, steel (rectangular box type), also used for Drydock No. 4.		
Dewatering pumps_____	Three 54", 1,200 hp, 390,000 gpm total. Time to dewater: 195 min.		
Drainage pumps_____	Two 16", 250 hp, 13,000 gpm total.		
flooding _____	Through culverts. Time to flood: 90 min.		
Capstans _____	13 total: 1 at head, 1 each side of entrance, 30 fpm at 24k; 5 each side, 30 fpm at 12k.		
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main	50 lg tons	113'6"	
Auxiliary	25 lg tons	185'9"	
Whip	5 lg tons	220'0", 108'3" min radius	
Ringer Crane Maximum Capacities and Heights			
Main	133.9 lg tons	158'0"	
Ship and industrial Services Furnished at Dock			
Electrical	Volts	Amp	Receptacles
Ac, 3 Ph, 80 HZ	460	8,000	2 west side at 4,000 amps.
Ac, 3 Ph, 80 Hz	460	4,800	2 east side at 2,400 amps.
Ac, 3 Ph, 80 Hz	460	4,800	2 east side at 2,400 amps.
Ac, 3 Ph, 60 Hz	460	3,500	East side: 1 at 2400 amps, 1 at 600 amps, 1 at 500 amps.
Item	Data		
Fresh water _____	3", 4" and 6 mains, 2,000 gpm at 80 psi, thirty-six 2-1/2" outlets each -side.		
Pure water _____	1-1/2" and 3' main, 75 gpm at 84 psi, two 1-1/2" outlets east side three 1-1/2" outlets west side.		
Salt water _____	12" mains, 7,000 gpm at 100 psi, twenty-four 4" outlets each side.		
Fire protection _____	Same as salt water, plus four 2-1/2" outlets each side.		
Compressed air _____	3", 4" and 6" mains, 8,000 cfm at 80 psi, twelve 2-1/2" outlets each side. 2-1/2" headers at dock floor with outlets		
Steam _____	4", 6" east and 8" west side mains, 37,000 phr at 80 psi, twelve 2-1/2" outlets each side.		
Oxygen _____	2" west and 3" east side mains, 1,400 cfm at 100 psi, six 1" outlets each side.		
Sanitary sewer _____	8" mains, 400 gpm, eighteen 6" and fourteen 4" inlets each side.		

Figure 62 (continued)
Puget Sound Naval Shipyard Drydock No. 5

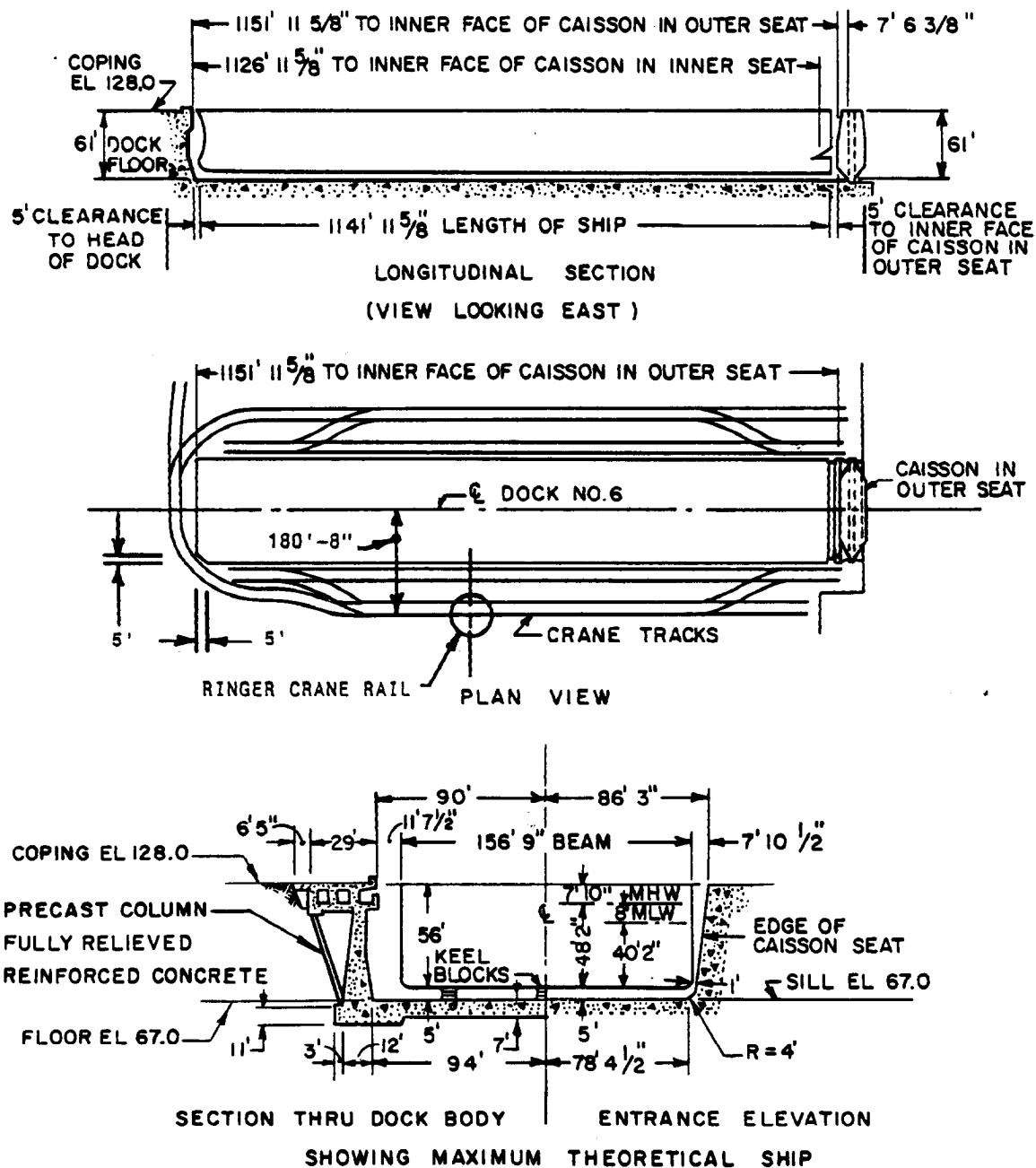


Figure 63
Puget Sound Naval Shipyard Drydock No. 6

Date Completed	Suitable for Docking	Foundation	Construction Material
1962	CV, CVN	Earth	Concrete
item	Data		
Closure_____ Caisson, steel (rectangular box type). Dewatering pumps_ Four 54", 1,500 hp, 456,000 gpm total. Time to dewater 230 min. Drainage pumps__ Three 20", 400 hp, 45,000 gpm total. Flooding_____ Through culverts. Time to flood: 90 min. Capstans_____ 11 total: 1 at head, 1 each side of entrance, 30 fpm at 30k, 4 each side, 30 fpm at 15k.			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main Auxiliary whip	50 lg tons 25 lg tons 5 lg tons	97'0" 156'4" 220'0", 108'3" min radius	
Ringer Crane Maximum Capacities and Heights			
Main	133.9 lg tons	99' 0"	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	4,160	3,000	2 east side at 1,500 amps.
Ac, 3 Ph, 60 Hz	460	8,000	2 east side at 4,000 amps.
Ac, 3 Ph, 60 Hz	460	5,600	4 east side at 800 amps; 4 west side at 600 amps.
Ac, 3 Ph, 60 Hz	460	4,800	2 west side at 2,400 amps.
Ac, 3 Ph, 60 Hz	460	4,000	1 east side at 4,000 amps.
Ac, 3 Ph, 60 Hz	460	3,500	2 east side at 1,600 amps.
Item	Data		
Fresh water _____	6" mains, 1,600 gpm at 80 psi, twenty-one 2-1/2" outlets east side, fourteen 2-1 /2' outlets west side.		
Pure water _____	2" and 3' mains, 75 gpm at 80 psi, two 1-1/2" outlets west side, one 1-1 /4" outlet east side.		
Salt water _____	10" west, 10" and 20 east side mains, 12,000 gpm at 125 psi, nineteen 4" and seven 2-1/2 outlets each side. 2-1/2" headers with 2-1/2' outlets at dock floor		
Fire protection_____	Same as salt water.		
Compressed air — 6"	mains, 10,000 cfm at 80 psi, fifty-six 1-1/4" outlets each side. 3" headers at dock floor with outlets.		
Steam _____	6"& 12" mains, 80,000 phr at 150 psi, fourteen 2-1/2' outlets each side.		
Oxygen_____	3" mains, 1,650 cfm at 100 psi, seven 1" outlets each side.		
Sanitary sewer_____	10" east side main, 300 gpm, thirty 4" inlets each side.		

Figure 63 (continued)
Puget Sound Naval Shipyard Drydock No. 6

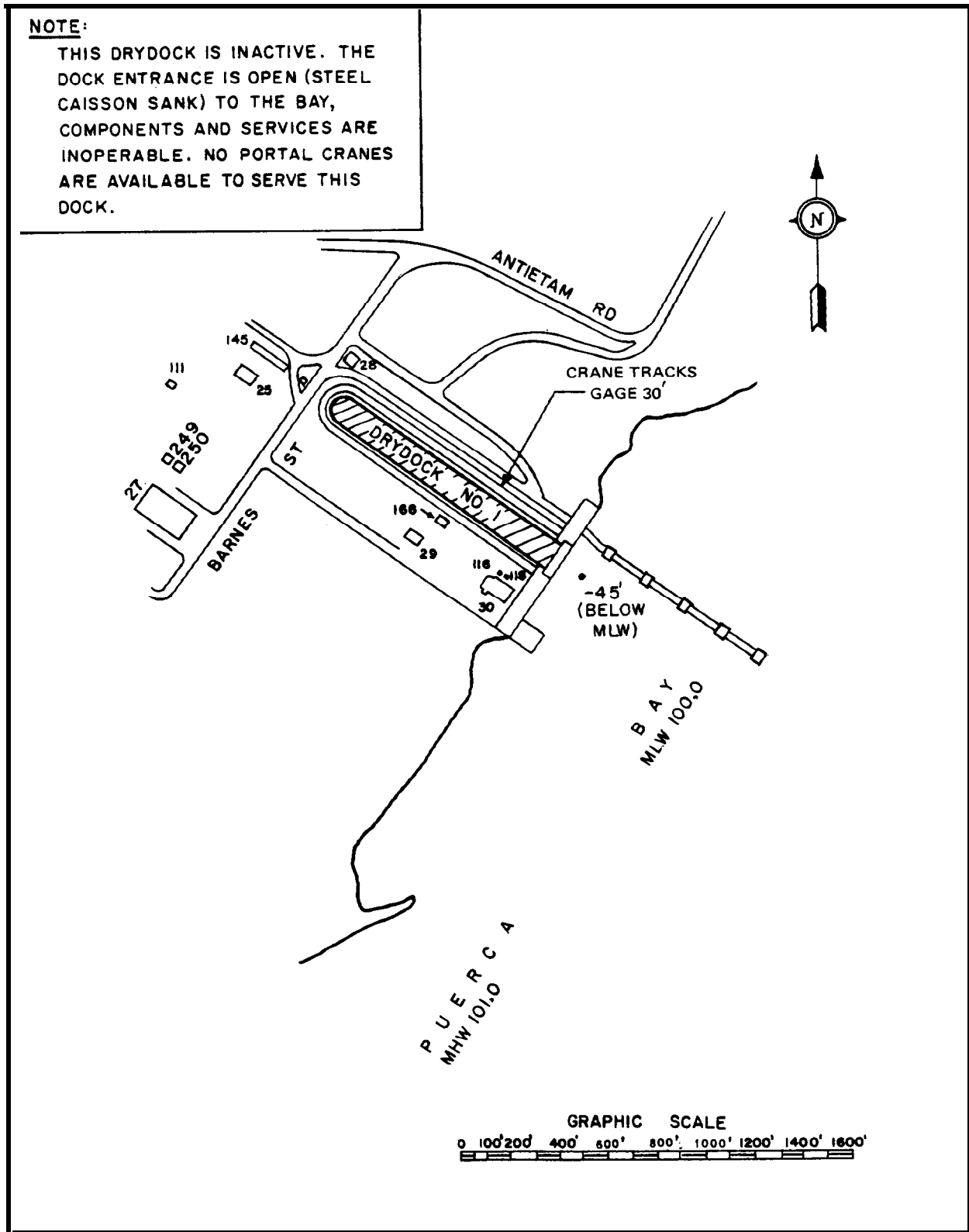


Figure 64
Location of Drydock, Roosevelt Roads Naval Station, Vieques, Puerto Rico

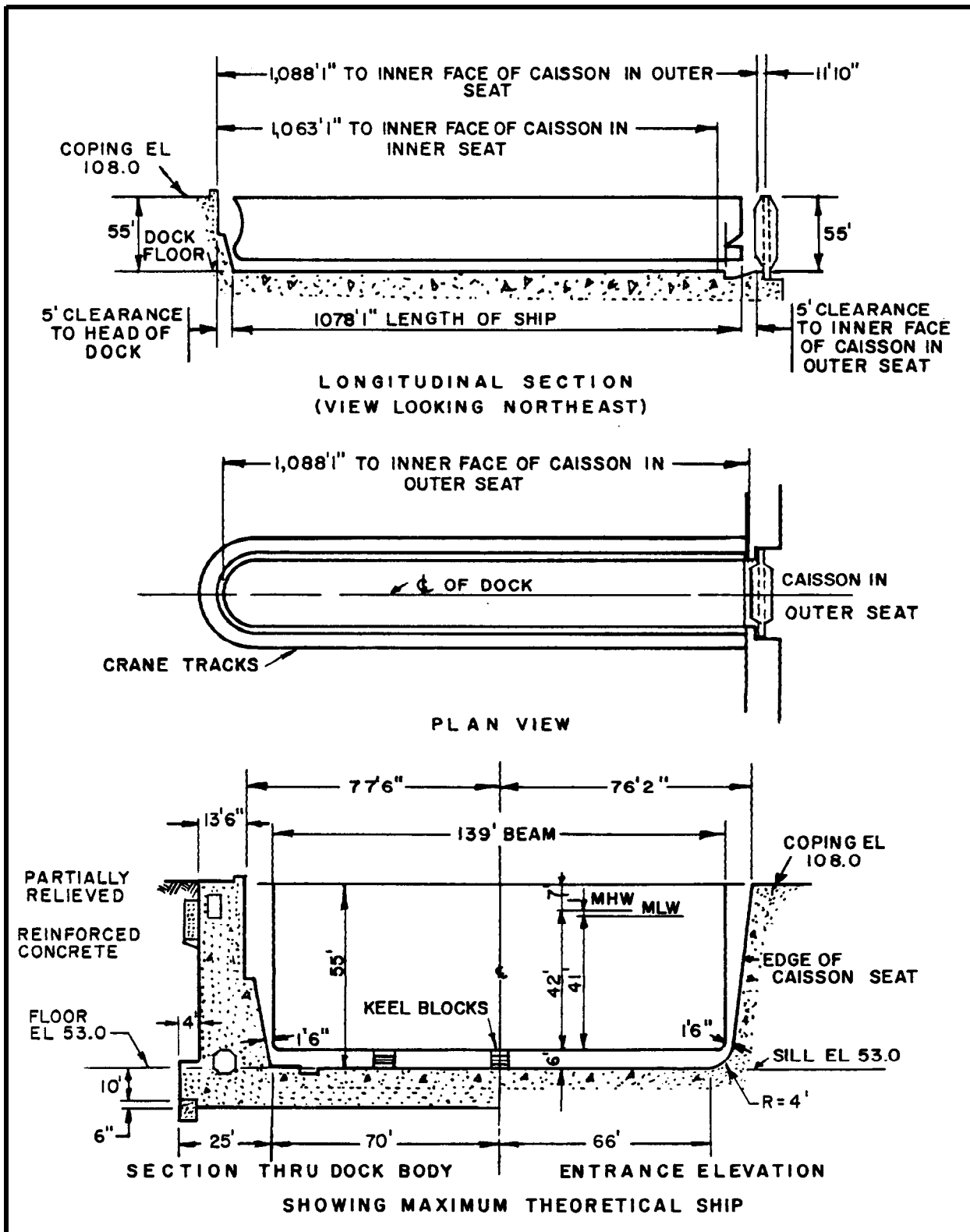


Figure 65
Roosevelt Roads Naval Station Drydock No. 1

Date Completed	Suitable for Docking	Foundation	Construction Material
1944	INACTIVE	Earth	Concrete
<div>(INOPERABLE)</div> <div>Closure _____ Caisson, steel (rectangular box type). Spare caisson, reinforced concrete (rectangular box type).</div> <div>Dewatering pumps ____ Four 54", 1,250 hp, 368,000 gpm. Time to dewater: 165 min.</div> <div>Drainage pumps _____ Two 16",250 hp, 12,000 gpm.</div> <div>Flooding _____ Through culverts. Time to flood: 160 min.</div> <div>Capstans _____ 13 total: 1 at head, 1 each side of entrance, 30 fpm at 24k; 5 each side, 30 fpm at 12k.</div>			
Portal Crane Maximum Capacities and Heights			
No Portal Cranes Available to Serve this Dock			
Ship and Industrial Services Furnished at Dock (INOPERABLE)			
Electrical	Volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	3.000	6 north side and 2 south side, 400 amp panel.
Ac, 3 Ph, 60 Hz	460	3,000	3 south side, 1,600 amp panel.
<div><div>Item</div><div>Data</div><div>Fresh water _____ 6 mains, 560 gpm at 125 psi, six 2“ outlets north side, five 2-1/2" and five 2 outlets south side.</div><div>Salt water _____ 8" mains, 1,800 gpm at 125 psi, six 2-1/2’ outlets north side, five 2-1/2” outlets south side.</div><div>Fire protection _____ 6“ mains, 1,600 gpm at 125 psi, five 6’ outlets north side, eight 6“ outlets south side.</div><div>Compressed air _____ 6" mains, 6,000 cfm at 100 psi, six 2-1/2” outlets north side, five 2-1/2” outlets south side.</div><div>Steam _____ 6“ mains, 24,000 phr at 120 psi, six 2-1/2" and six 2" outlets north side, five 2-1/2' and five 2" outlets south side.</div><div>Sanitary sewer _____ 8" mains, twenty-seven 4" inlets each side.</div></div>			

Figure 65 (continued)
Roosevelt Roads Naval Station Drydock No. 1

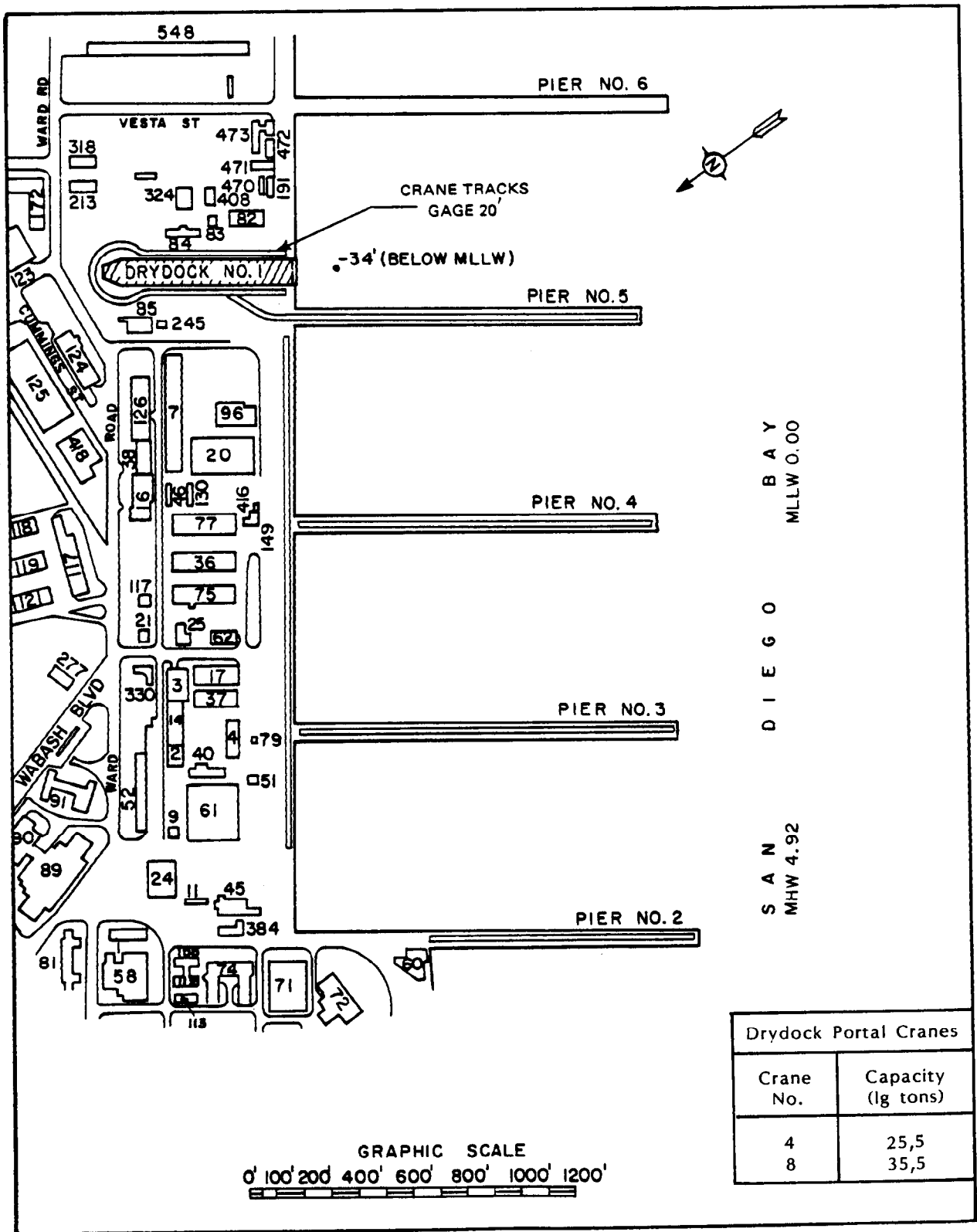


Figure 66
Location of Drydock, San Diego Naval Station, San Diego, California

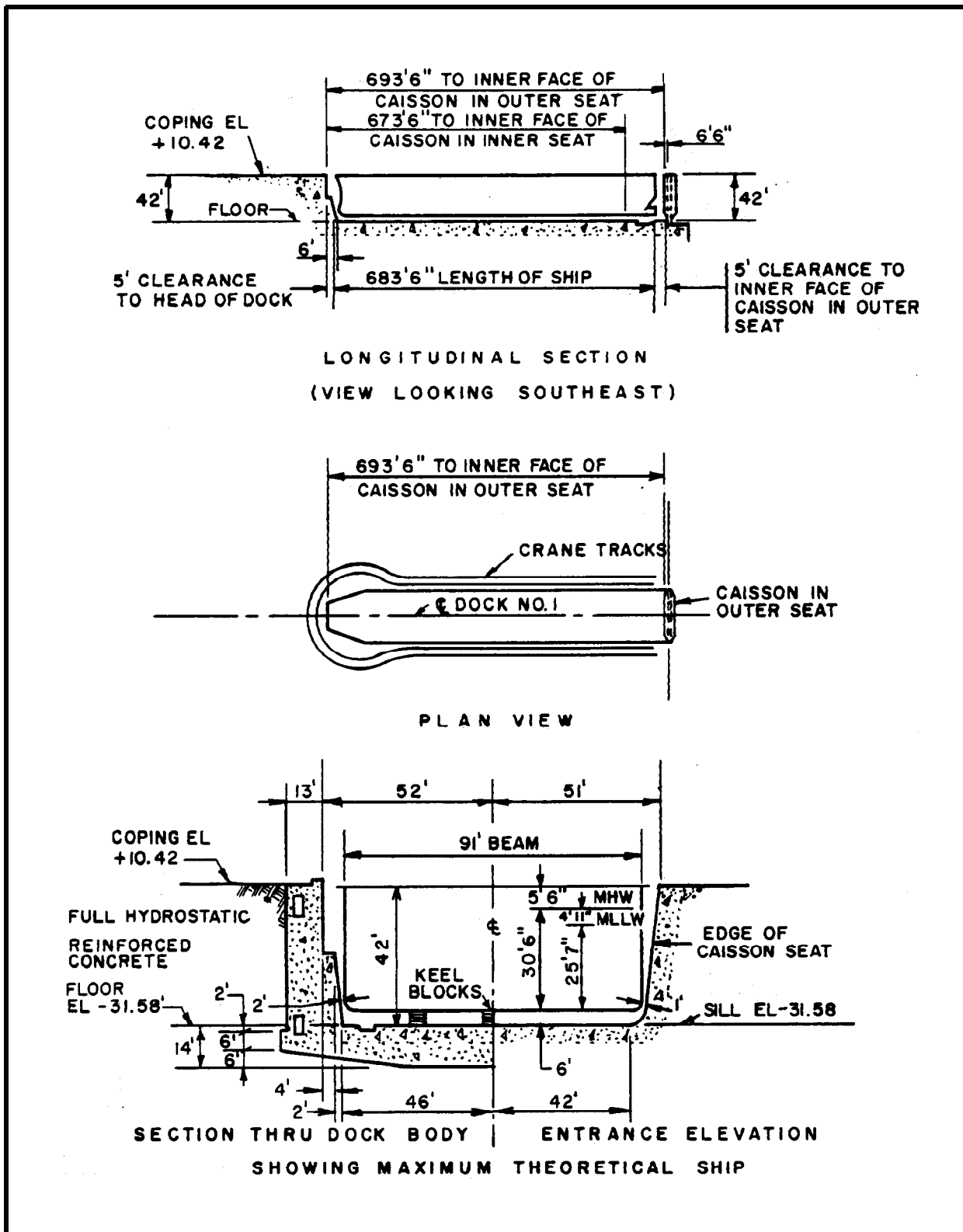


Figure 67
San Diego Naval Station Drydock No. 1

Date Completed	Suitable for Docking	Foundation	Construction Material
1942	CG	Earth	Concrete
<div>Closure _____ Caisson, steel (rectangular box type).</div> <div>Dewatering pumps_____ Two 54",600 hp, 220,000 gpm. Time to dewater 130 min.</div> <div>Drainage pumps _____ Two 16",200 hp, 14,000 gpm.</div> <div>flooding _____ Through culverts. Time to flood: 60 min.</div> <div>Capstans _____ 7 total: 1 at head, 1 each side of entrance, 30 fpm at 36k; 2 each side, 30 fpm at 12k.</div>			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main	35 lg tons	85'0"	
Auxiliary	5 lg tons	100'0"	
Ship and Industrial Services Furnished at Dock			
Electrical	Volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	2,600	6 north side and 4 south side at 400 amps; 1 each side of entrance at 100 amps.
Ac, 3 Ph, 60 Hz	115/230	1,600	4 each side.
<div>Fresh water _____ 6" north and 12" south side mains, 1,500 gpm at 90 psi, five 2-1/2" outlets each side.</div> <div>Salt water _____ 10" mains, 3,500 gpm at 105 psi, eight 2-1/2" outlets each side.</div> <div>Fire protection _____ Same as saltwater.</div> <div>Compressed air _____ 6" mains, 7,500 cfm at 100 psi, five 2-1/2" outlets each side.</div> <div>Steam _____ 6" mains, 30,000 phr at 130 psi, five 2-1/2" outlets each side.</div> <div>Sanitary Sewer _____ 8" mains, 900 gpm, thirty 6" inlets each side.</div> <div>Natural gas _____ 1" main, 33 cfm at 10 psi, one 1" outlet north side.</div>			

Figure 67 (continued)
San Diego Naval Station Drydock No. 1

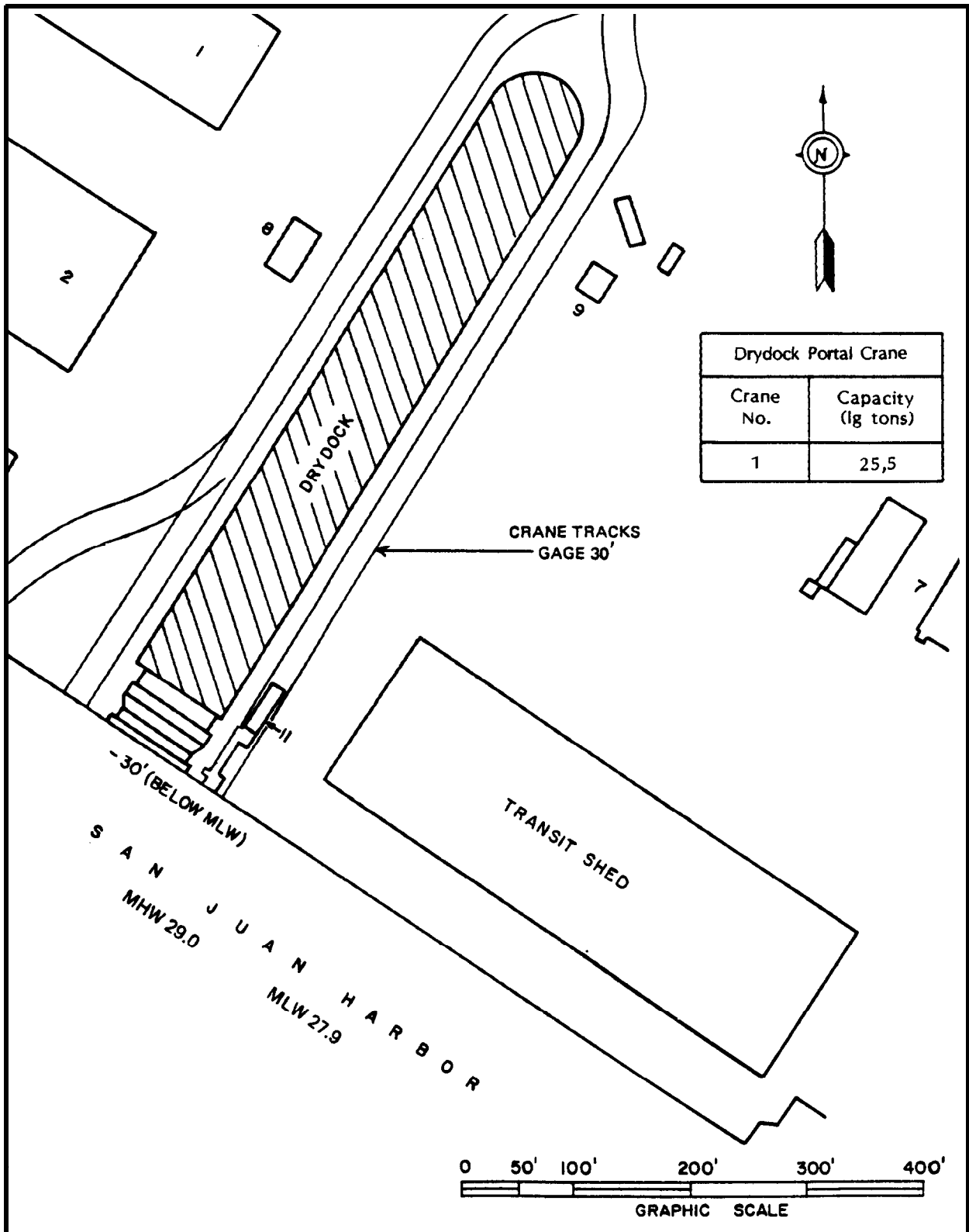
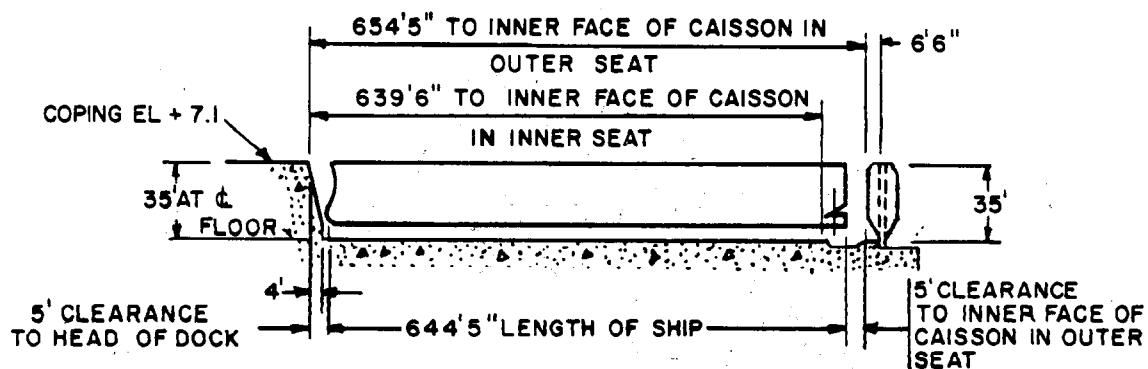
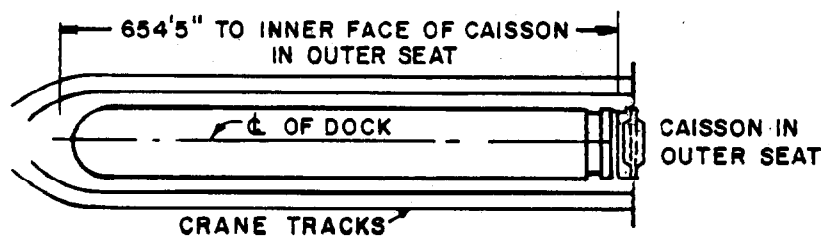


Figure 68
Location of Drydock, Naval Drydock and Repair Facility, San Juan,
Puerto Rico



LONGITUDINAL SECTION
(VIEW LOOKING SOUTHEAST)



PLAN VIEW

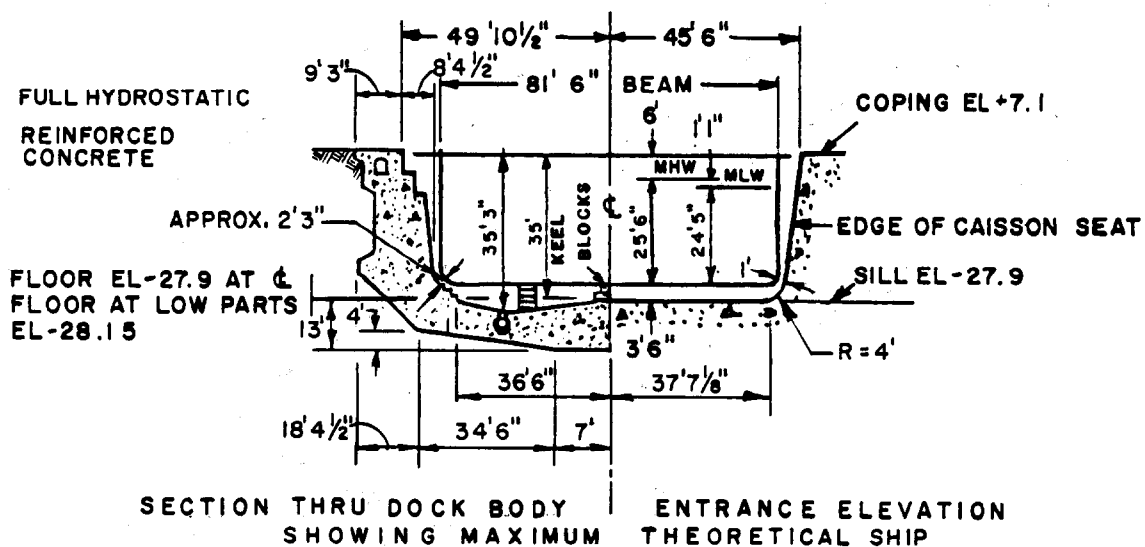


Figure 69
San Juan Naval Drydock and Repair Facility

Date Completed	Suitable for Docking	Foundation	Construction Material
1942	CG, AO	Earth	Concrete
<p> Closure _____ Caisson, steel (rectangular box type). Dewatering pumps _____ Three 36", 200 hp, 96,000 gpm. Time to dewater: 165 min. Drainage pumps _____ Two 10", 60 hp, 10,000 gpm. flooding _____ Through culverts. Time to flood: 75 min. Capstans _____ 5 total: 1 at head, 1 each side of entrance, 1 each side, 25 fpm at 5.5k. </p>			
Portal Crane Maximum Capacities and Heights			
Hook	5 ft beyond dock centerline	Max height above coping with hook at dock centerline	
Main Auxiliary	25 lg tons 5 lg tons	75'0" 95'0"	
Ship and Industrial Services Furnished at Dock			
Electrical	volts	Amp	Receptacles
Ac, 3 Ph, 60 Hz	460	1,000	2 north side
Ac, 3 Ph, 60 Hz	220	600	2 north side and 3 south side
<p> Fresh water _____ 6" mains, 50 psi, four 1-1/2" outlets each side. Salt water _____ 14" mains, 1,500 gpm at 125 psi, five 4 and five 2-1/2" outlets each side. Fire protection _____ Same as saltwater. </p>			

Figure 69 (continued)
San Juan Naval Drydock and Repair Facility

REFERENCES

Military Handbooks and Desire Manuals. Government agencies and the private sector may obtain standardization documents (specifications/handbooks) from the Commanding Officer, Naval Publications and Forms Center (NPFC), 5801 Tabor Ave., Philadelphia, PA, 19120. Government agencies must order design manuals/P-pubs using the Military Standard Requisitioning and Issue Procedure (MILSTRIP) system from NPFC. The private sector must write to NPFC, Cash Sales, Code 1051, 5801 Tabor Ave., Philadelphia, PA, 19120.

DM-29.1 Graving Drydocks

DM-29.2 Marine Railways

CUSTODIAN
NAVY - YD

PREPARING ACTIVITY
NAVY - YD

PROJECT NO.
FACR-0223

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